



2012 ORV Technical Update

Welcome To The 2012 ORV Technical Update

Home page





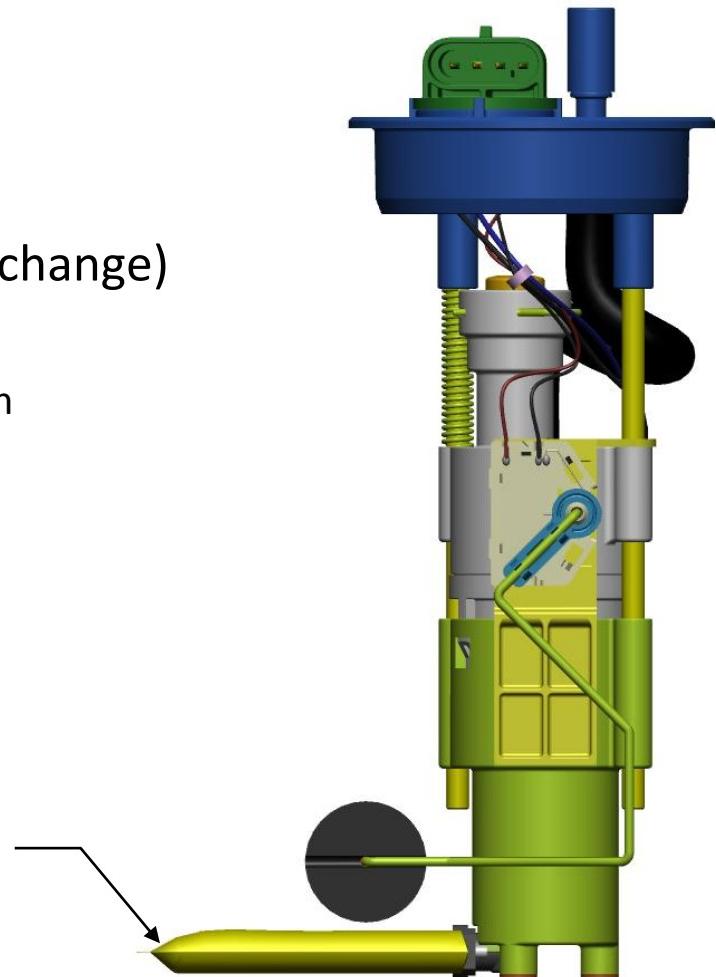
Agenda

- ORV general information
 - Fuel pump pre-filter
- Full Size RANGER information
 - New model
 - ALL 800 models
 - RANGER HD
 - RANGER Diesel
- Mid Size RANGER information
 - RANGER EV
 - RANGER 500 EFI
 - RANGER 500 Crew EFI
- RZR information
 - New model
 - All RZR models
 - All 800 models
 - All 50" models
 - RZR XP
- ATV information
 - All ADC models
 - All Sportsman XP models
 - Sportsman 550 XP
 - Sportsman 850 XP
 - Classic Sportsman
- Team Tip and Service Bulletins

ORV Fuel Pump

- Most EFI ORV
- Revised fuel pump pre-filter screen (running change)
 - 10 micron (model year 2011 30 micron)
 - Smaller the micron number, increased filtration
 - Service fuel pump kits to follow

Fuel pump pre-filter screen



RANGER Diesel Crew

YANMAR 900 Diesel

- New model added to the RANGER line up
- RANGER Diesel Crew
- All the Features of *RANGER CREW* with Diesel Power
- 900 Diesel Engine
- 90% of peak torque available at 1600 RPM
- 55 Amp Alternator
- 40% more range than the comparable gas model
- Isolation mounted YANMAR diesel; low vibration



2012 RANGER Crew Diesel



Full Size RANGER

- What changed?
 - All RANGERS
 - New hood latch
 - Revised seat base
 - Added center seat support
 - Revised heat management
 - Reduced cab heat in the seated area
 - Improved transmission serviceability
 - RANGER with 800 engine
 - Revised air box lid
 - Rotated pre-filter opening
 - Two wire shift switch
 - Revised throttle body wires and routing
 - RANGER HD
 - Added EBS
 - RANGER Diesel
 - Revised drive and driven clutch

2012 RANGER 800 XP



2012 RANGER 800 6x6



2012 RANGER 800 HD



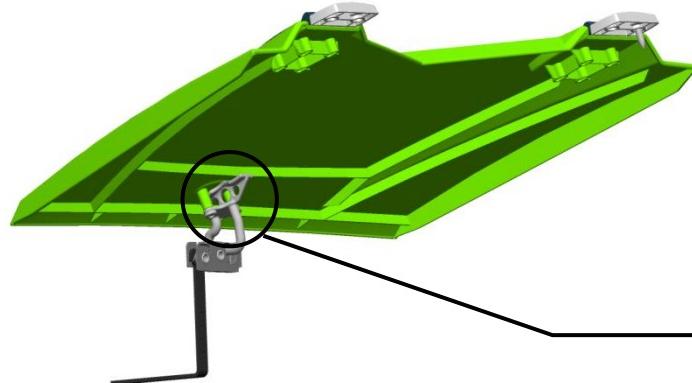
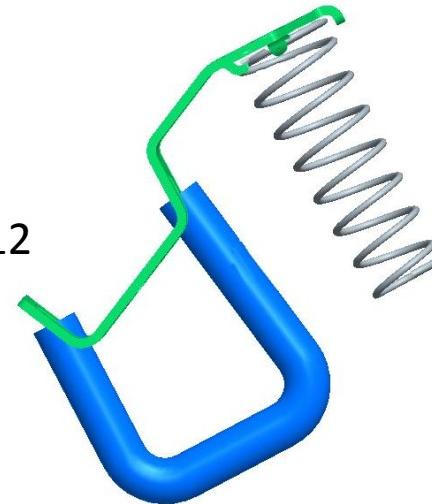
2012 RANGER Diesel



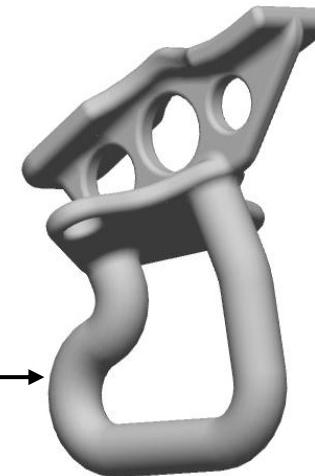
Full Size RANGER

- Revised hood latch
- Now one piece
 - Die cast
 - Will retrofit back to early models

Pre model year 2012



Model year 2012

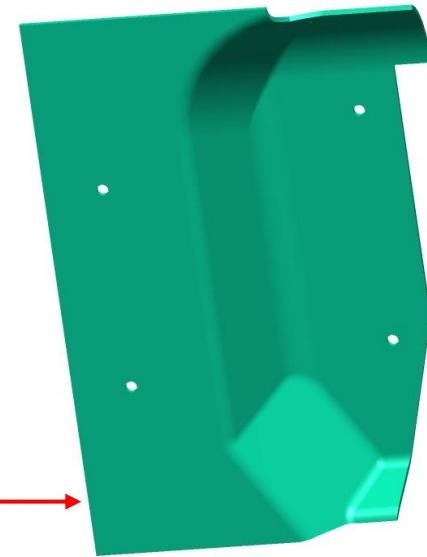
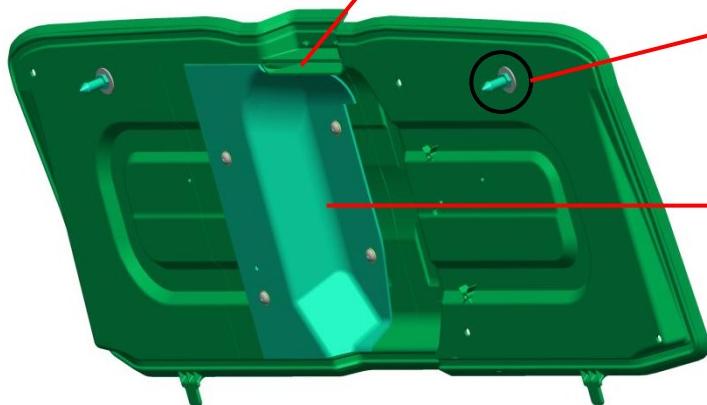
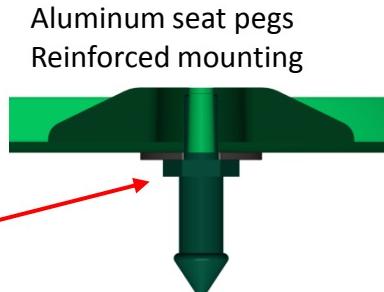


Full Size RANGER

- Revised seat base
 - RANGER Diesel
 - RANGER HD
 - RANGER XP
 - RANGER 6X6
 - RANGER CREW
 - Rear only



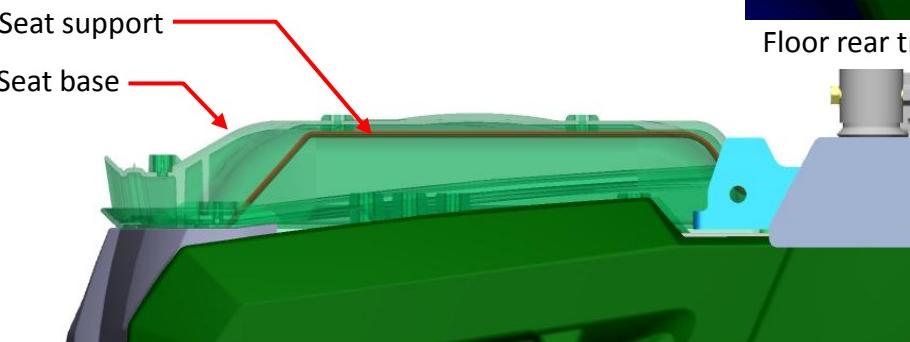
Added close off to seat base
obstructs heat from entering drivers compartment



Added heat shield (replaced foil)
Sandwiched material
Not featured on Diesel

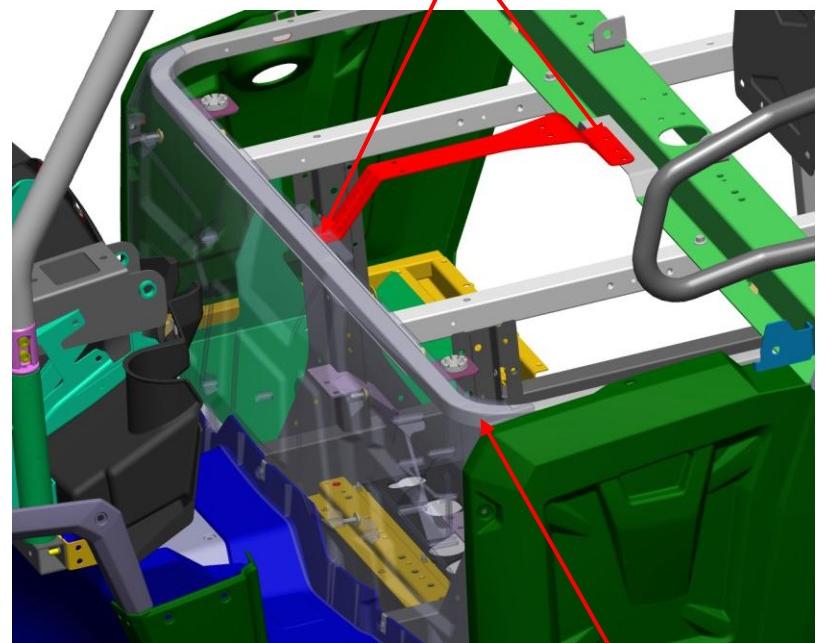
Full Size RANGER

- Added Seat Support
 - RANGER Diesel
 - RANGER HD
 - RANGER XP
 - RANGER 6x6
 - RANGER CREW
 - Rear only



Seat base transparent view

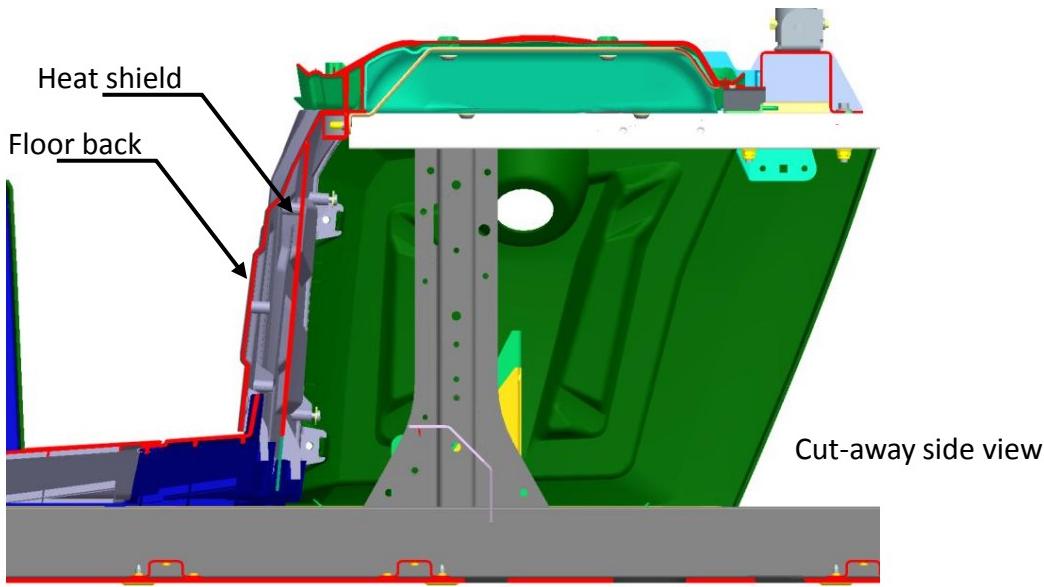
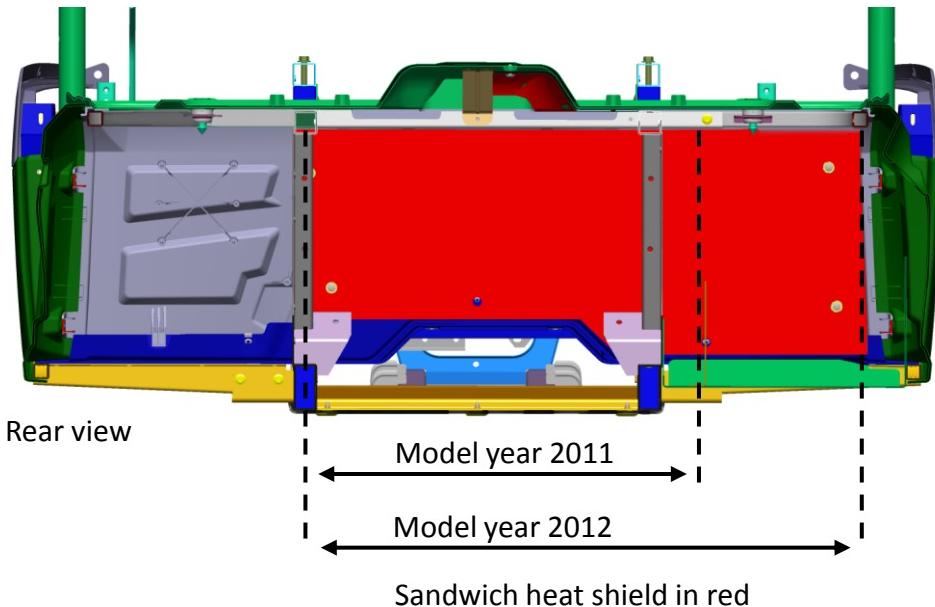
Seat Support
Fastened to cab seat base



Cab seat support

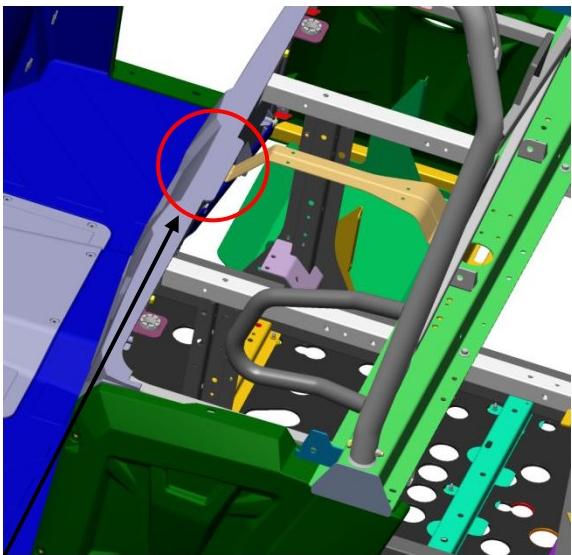
Full Size RANGER

- Revised floor rear heat shield
 - Sandwich material
 - RANGER Diesel
 - RANGER HD
 - RANGER XP
 - RANGER 6x6
 - RANGER CREW
 - Rear only

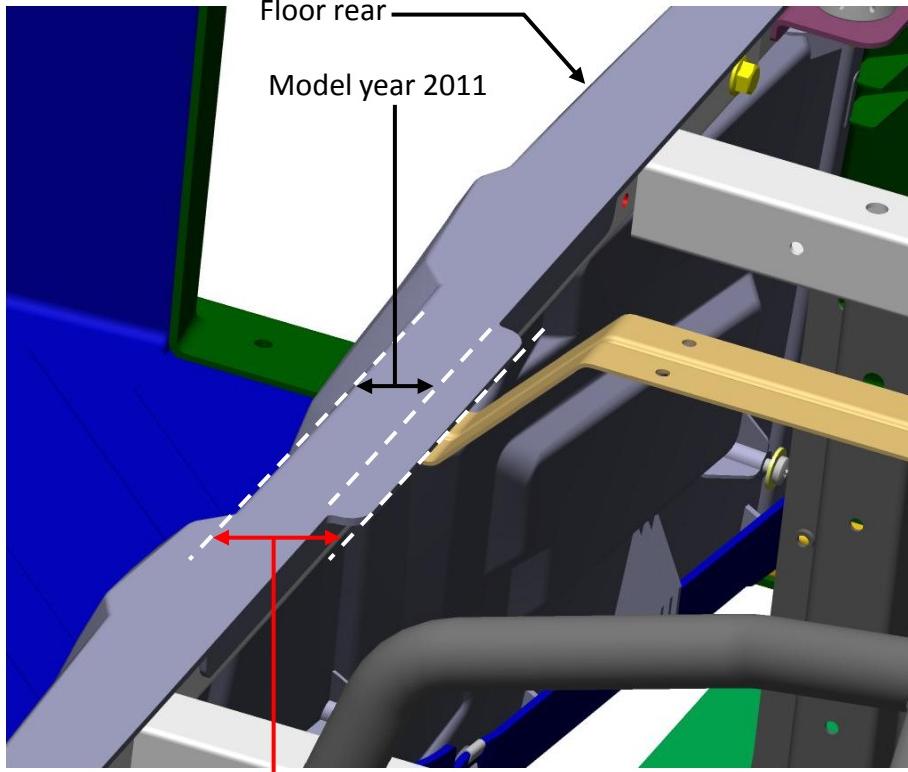


Full Size RANGER

- Revised floor rear
- Added material
 - Where seat contacts floor rear



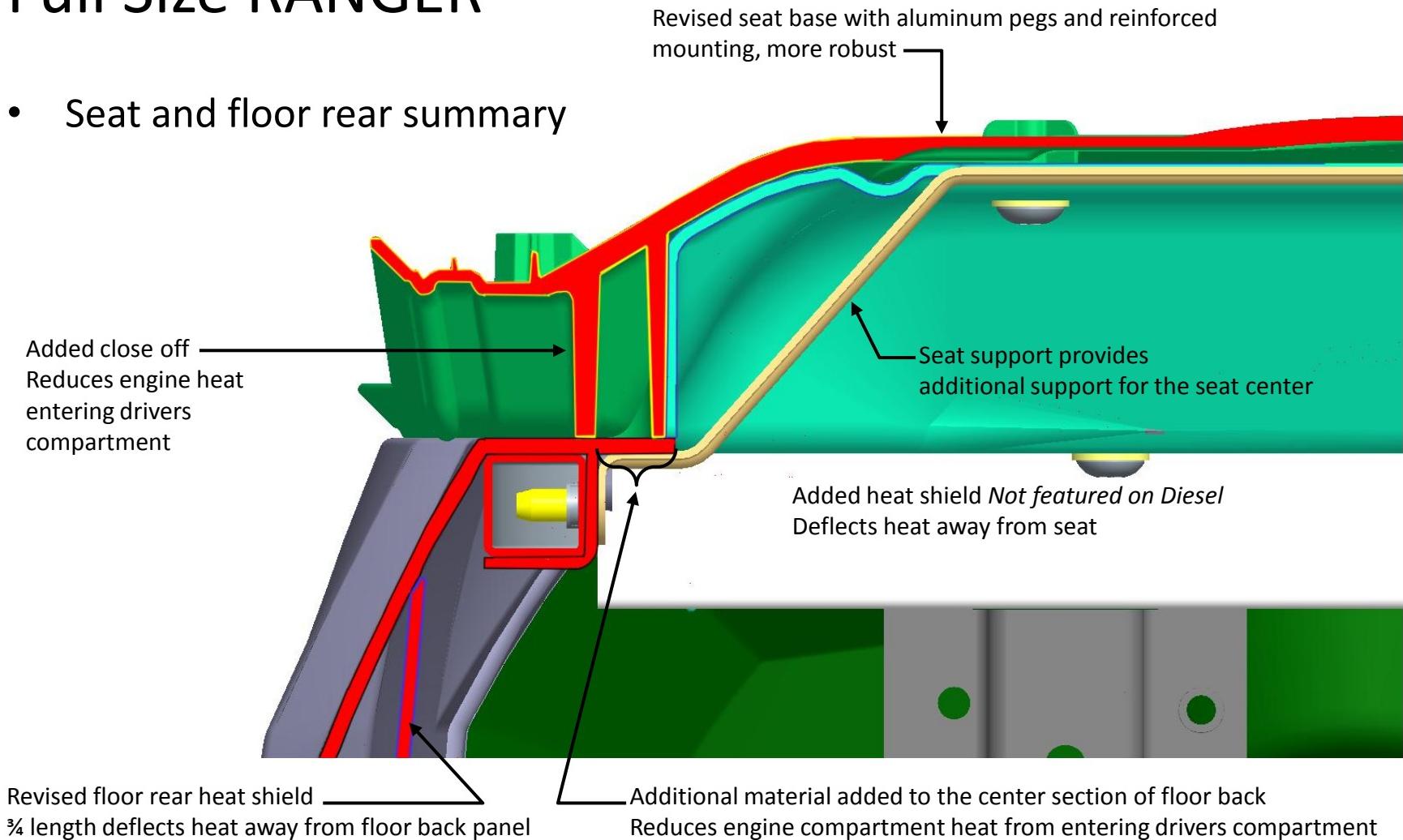
Additional material added to the center section of floor rear.



Enlarged view

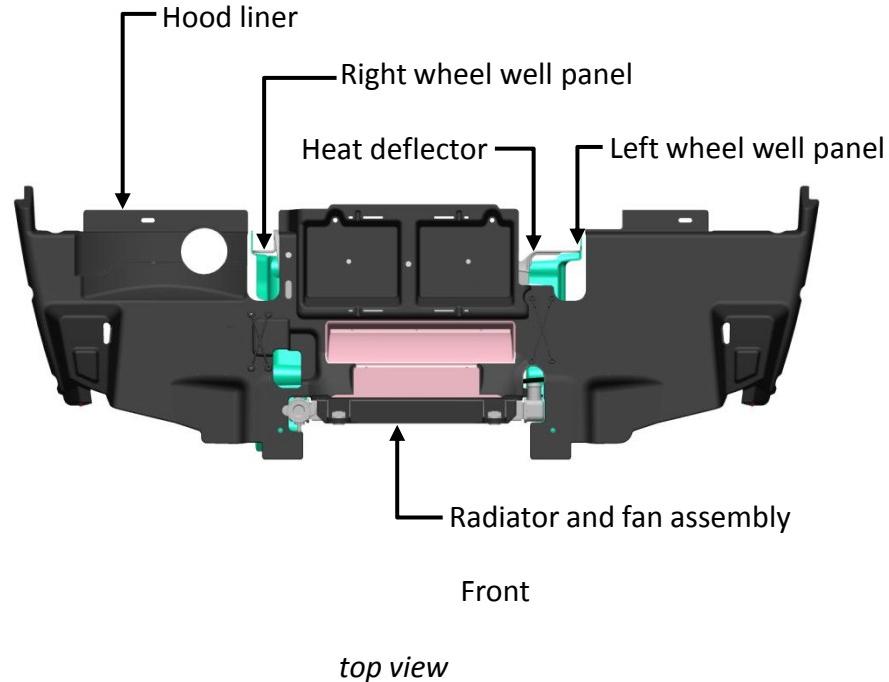
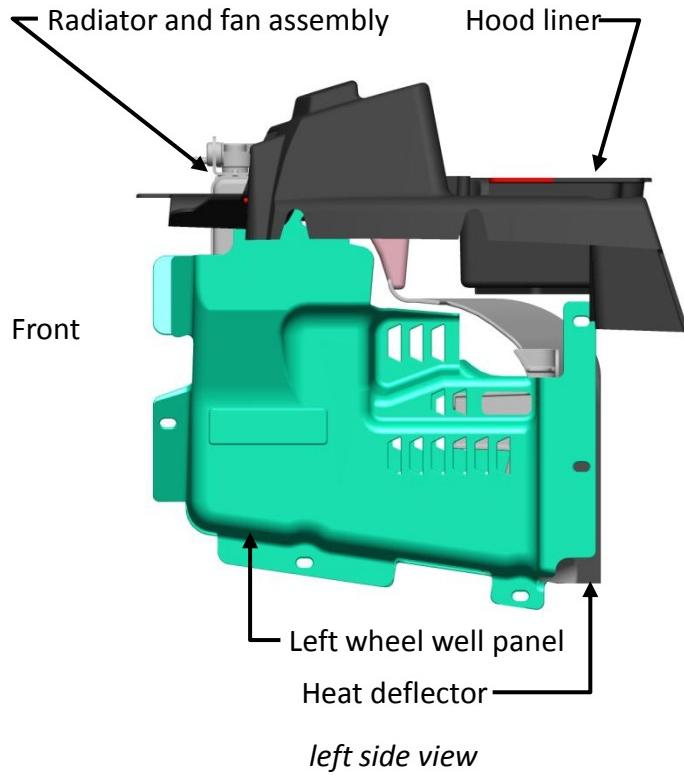
Full Size RANGER

- Seat and floor rear summary



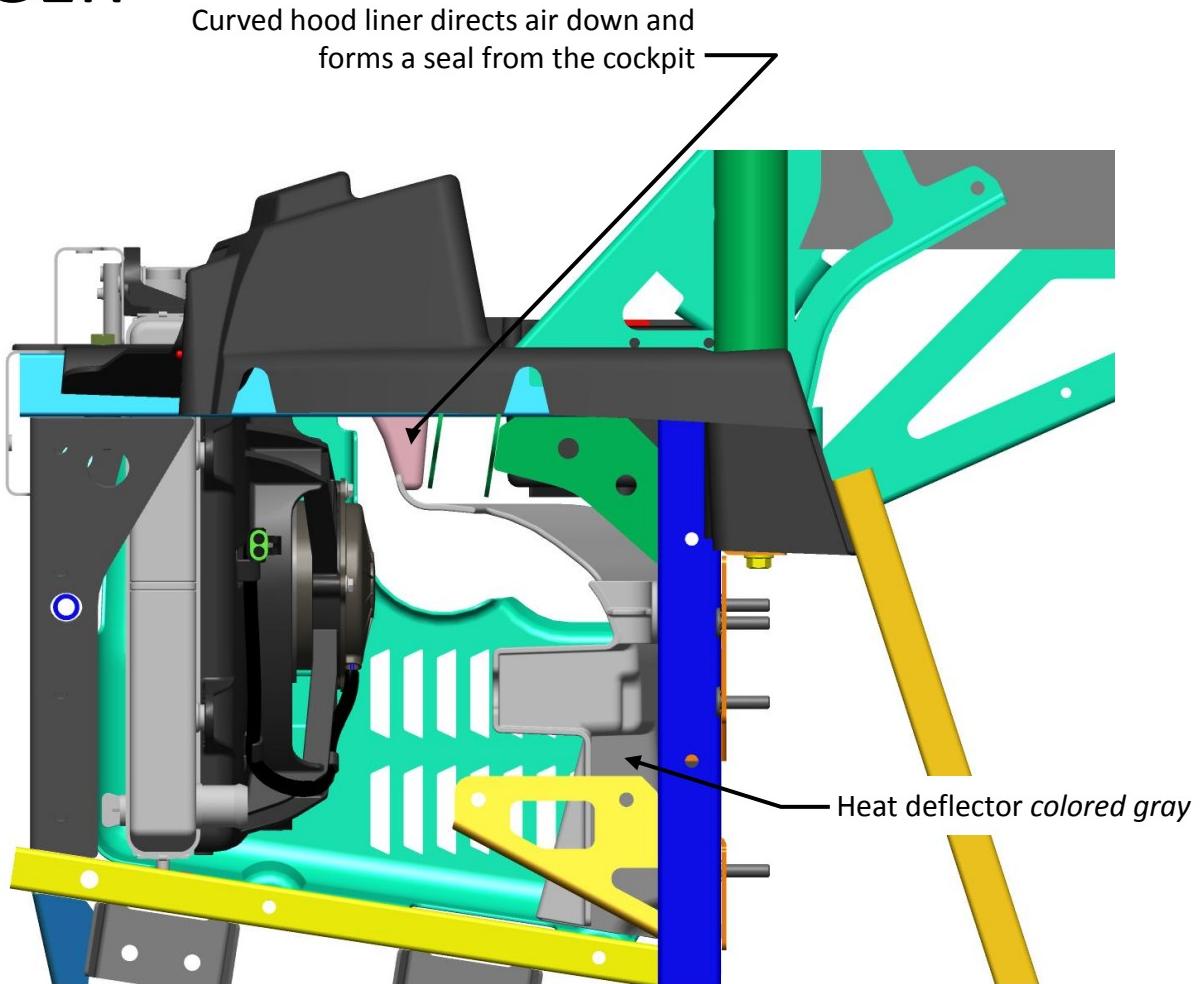
Full Size RANGER

- Revised panels
 - Hood liner
 - Left and right wheel well panels



Full Size RANGER

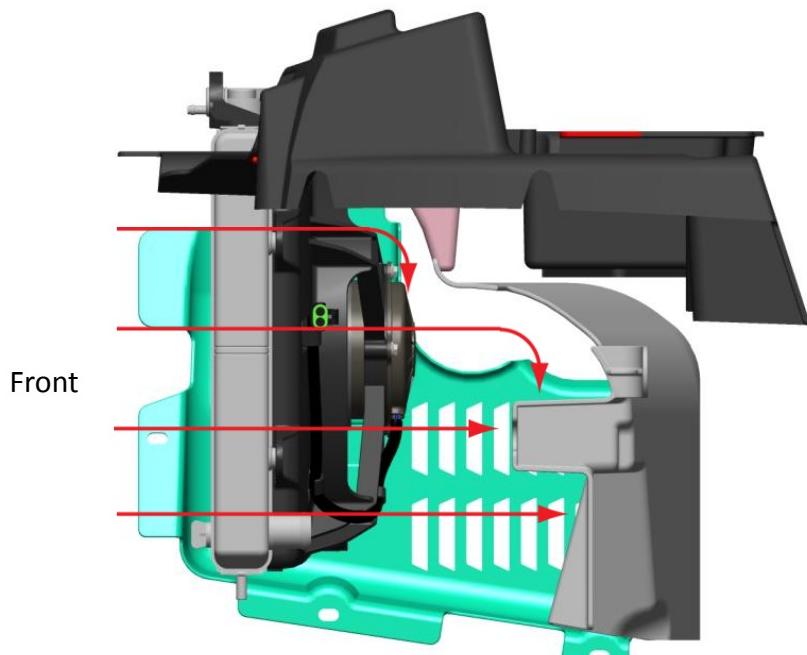
- Revised panels
- Heat deflectors



Full Size RANGER

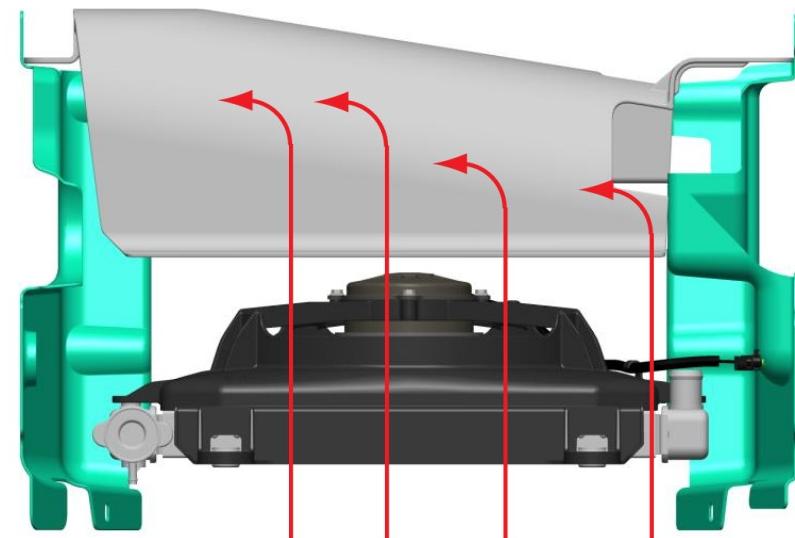
- Radiator air flow

Reduces radiator air from entering drivers compartment through foot pedals and steering shaft openings



Left wheel well panel removed

left side view

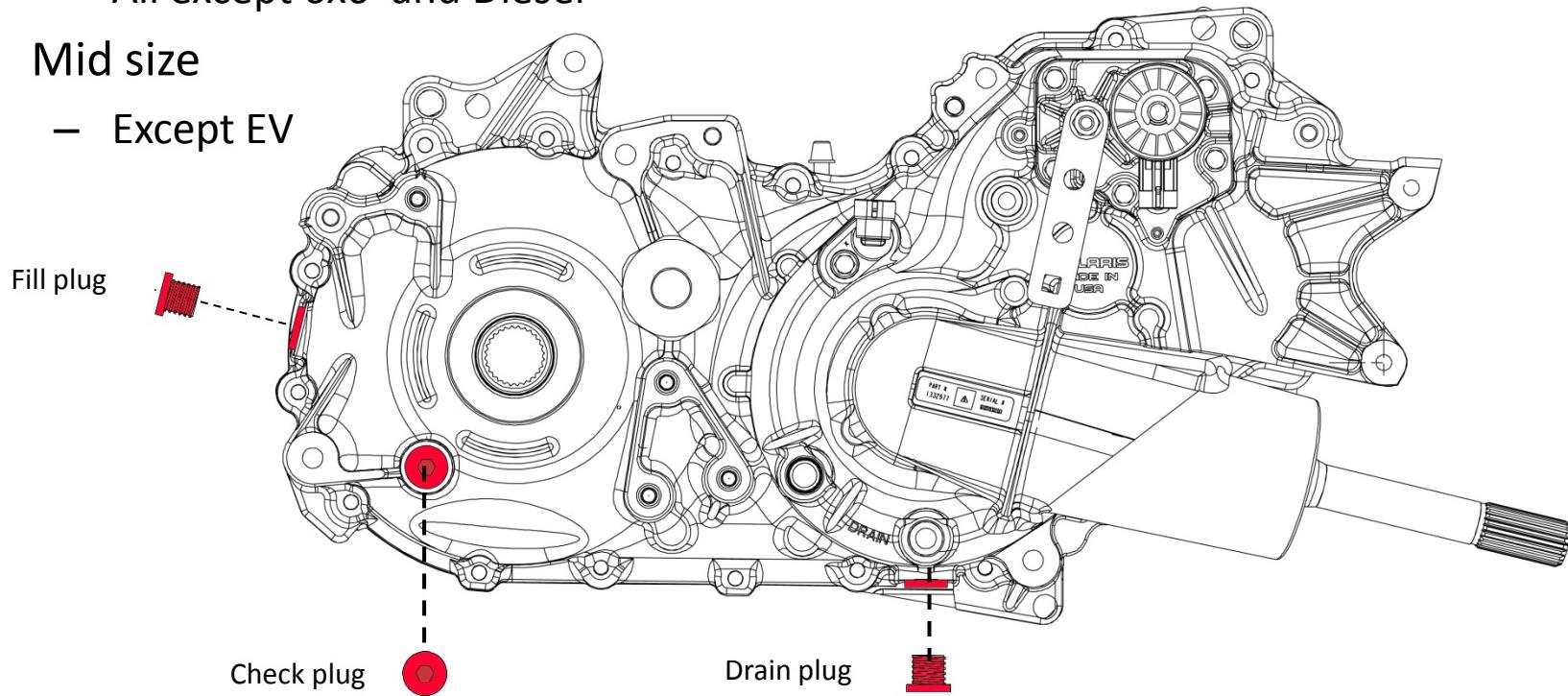


Viewed with hood liner removed

top view

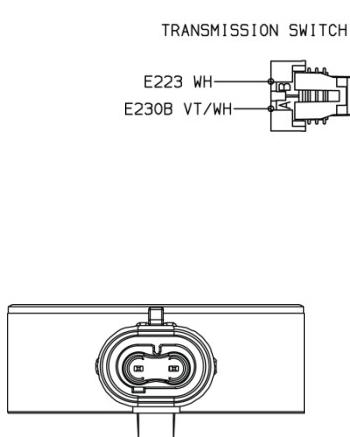
RANGER Gearcase

- Revised hex plug locations
- Full size
 - All except 6x6 and Diesel
- Mid size
 - Except EV

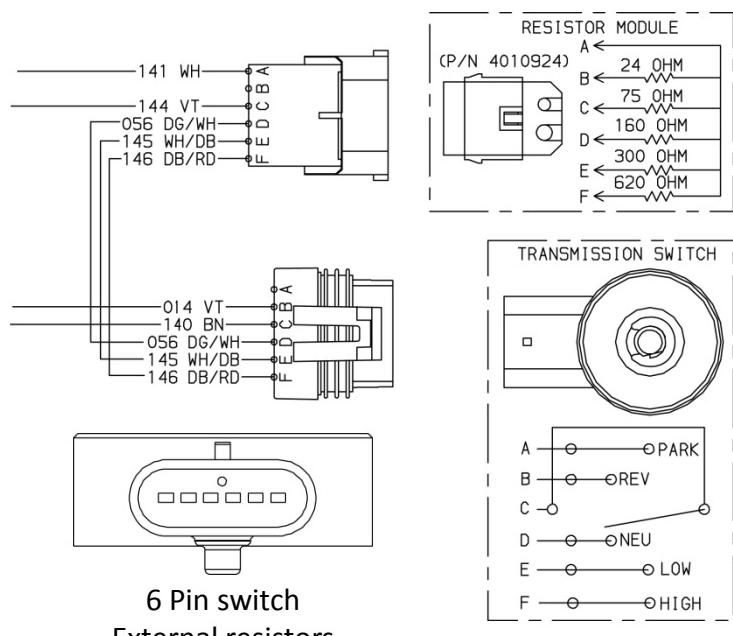
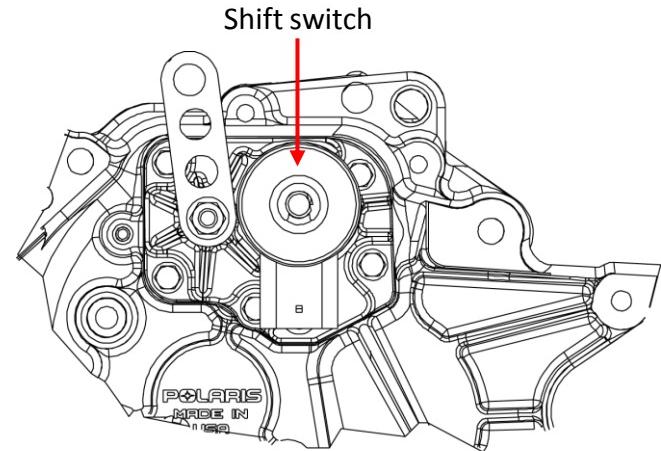


Side X Side Shift Switch

- 2 Pin switch
 - All 800 side by side
- 6 pin switch
 - RANGER Diesel



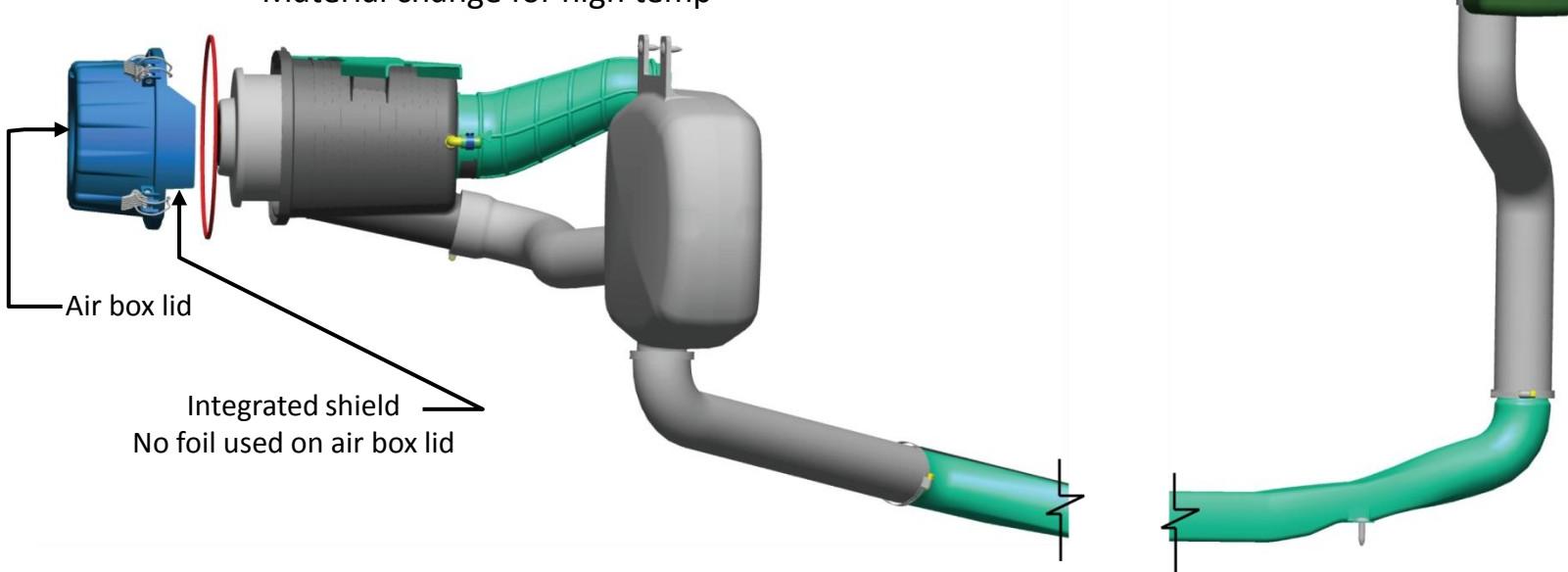
2 Pin switch
Internal resistors



RANGER 800

- Revised engine air intake
 - Pre-filter
 - Air box lid
 - Material change for high temp

Pre-filter box air inlet opening faces inside right fender instead of forward



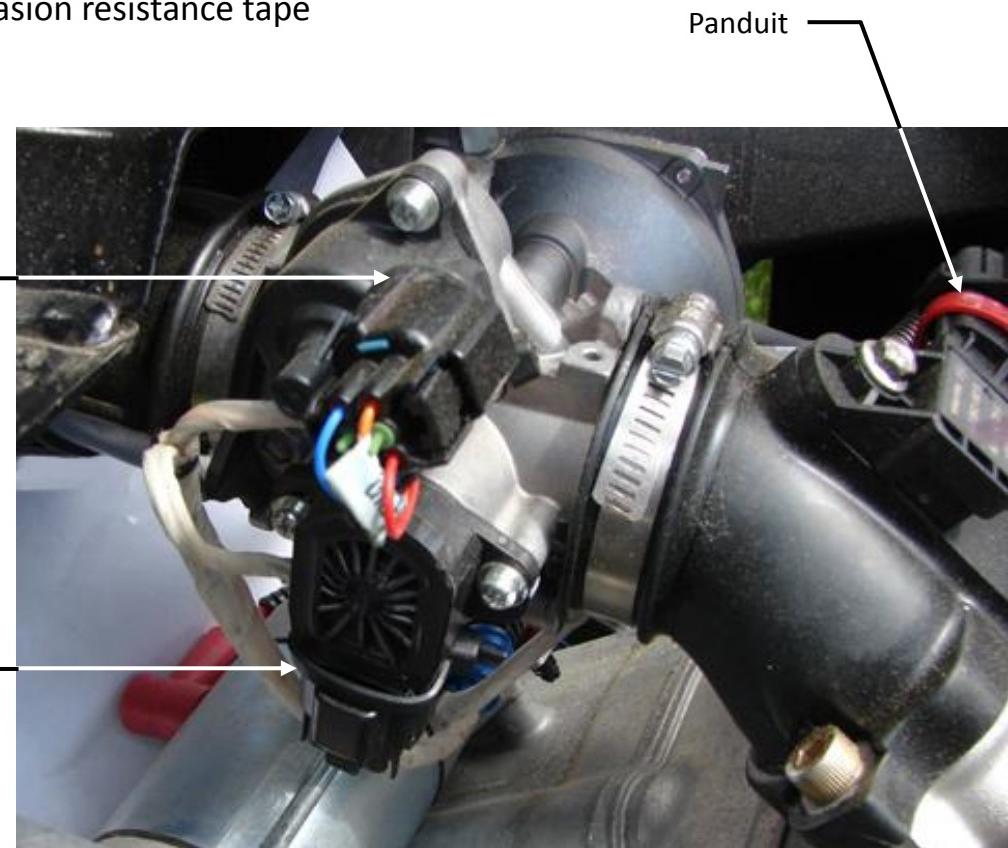
RANGER 800

- Throttle body wires pulled back tight and conduit secured
- Starter mounted bracket secures harness



RANGER 800

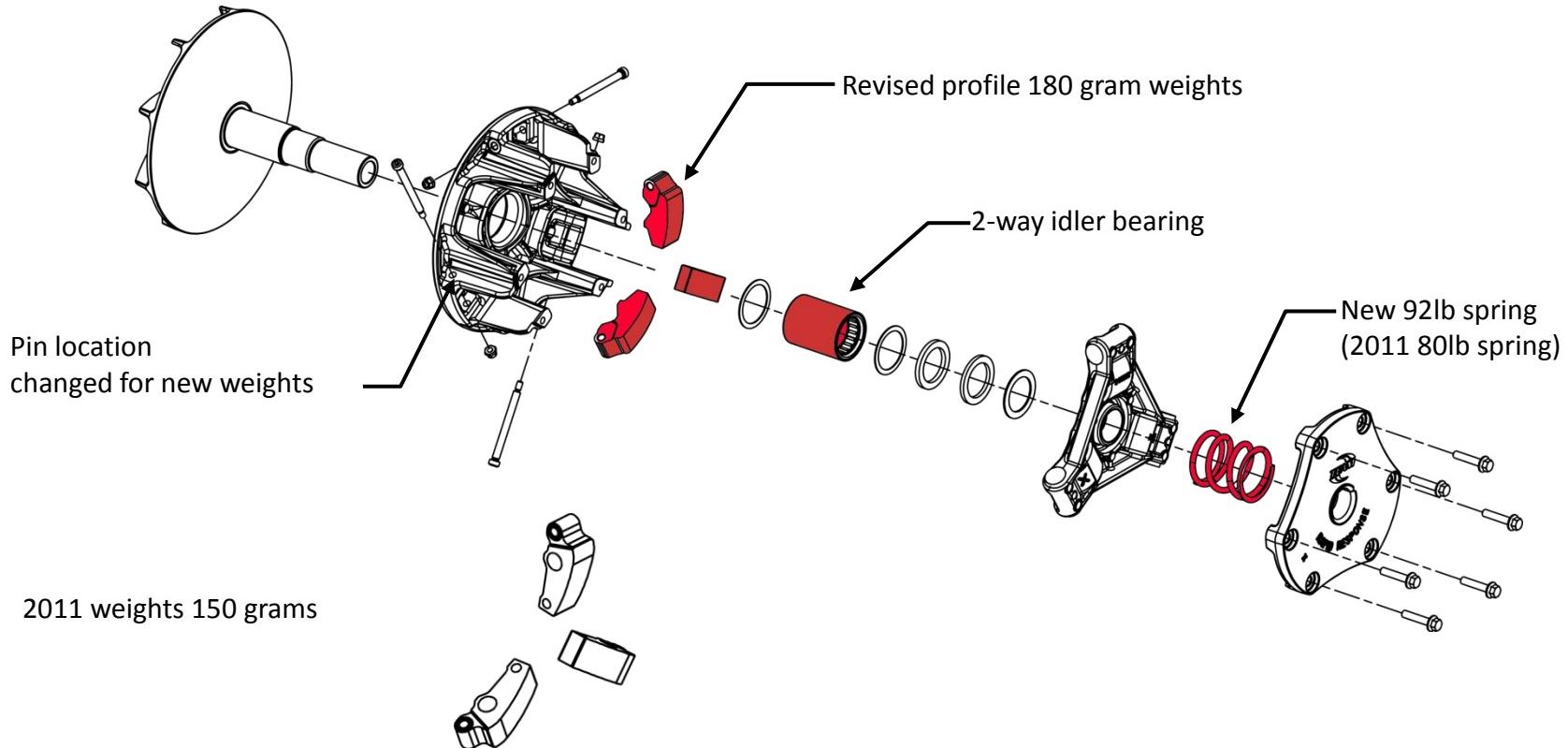
- Throttle body wires:
 - Wrapped with high temp, abrasion resistance tape
 - Teflon insulated wires
 - Revised length and routing



RANGER Diesel

- Revised drive clutch

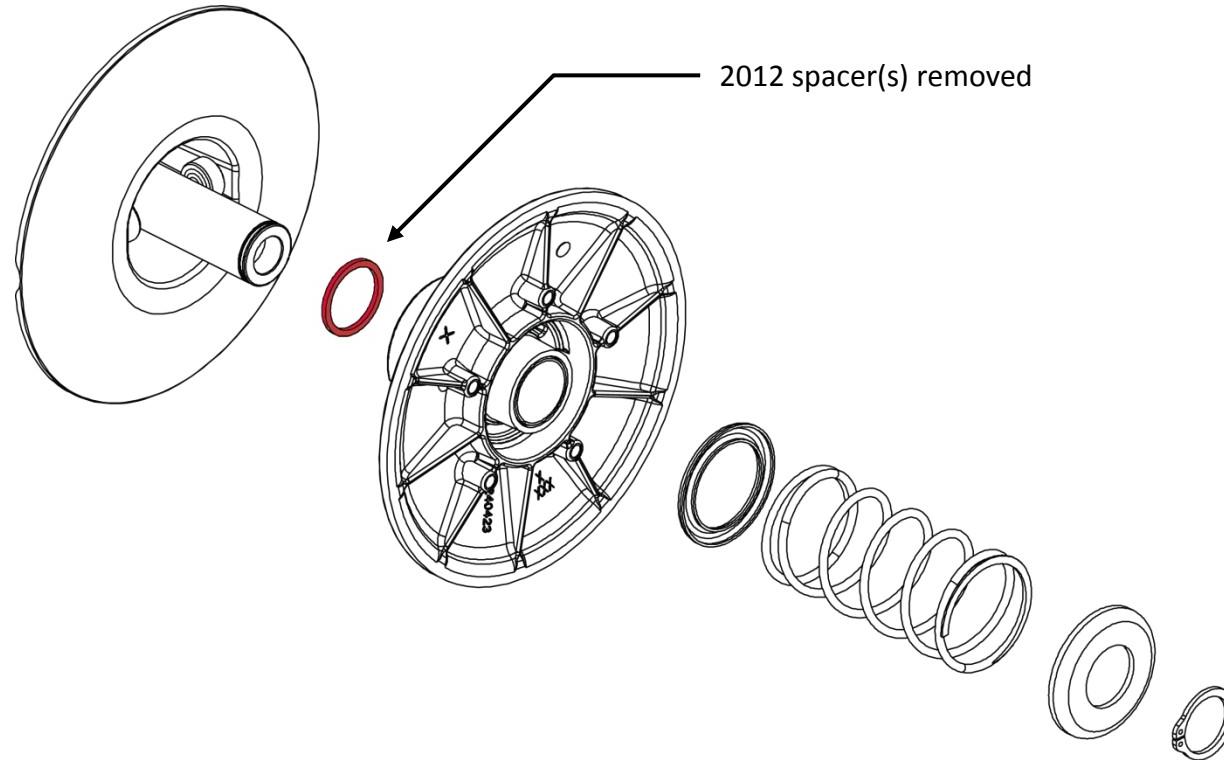
Weights and two-way bearing will not retrofit to 2011 models
Complete drive clutch will retrofit to 2011 models



Reduces shift effort and improves belt deflection

RANGER Diesel

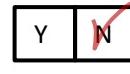
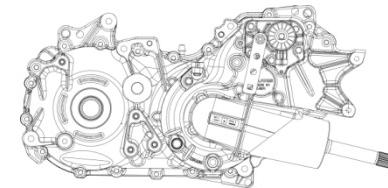
- Revised driven clutch



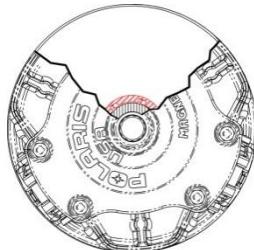
RANGER HD

- EBS added-HD only
- Specific gearcase
 - Internal component change
 - Kit-2012 RANGER XP only
 - No Crew
 - No Diesel
 - No 6 X 6
 - No pre-2012 RANGERS

2012 RANGER XP and HD gearcase features revised internal components for EBS function



Smooth one-way
EBS drive clutch

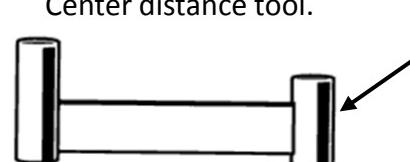


23/66 weights



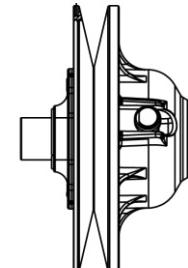
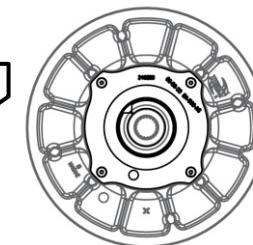
No offset tool. Visual adjustment only.
Refer to service manual.

Center-to-center adjustment using
Center distance tool.



10" (25.4 cm) Center distance tool

EBS driven clutch



POLARIS
INDUSTRIES INC.

Midsize Ranger

- RANGER 500 EFI and Crew 500 EFI
 - Speed key accessory
 - 25mph speed limit
- Improved transmission serviceability (all models)
 - same improvements as full size RANGER
- RANGER EV
 - Revised motor controller calibration
 - New motor temp sensor
 - Revised traction battery charger
 - New DC to DC converter
 - Added a DC to DC converter relay
 - Revised switch 12 splice circuit
 - Redundant power supply
 - New contactor connector
 - Revised 48 volt fuse box
 - Added auxiliary battery relay
 - Revised under hood fuse box
 - Revised front gear box
 - Added torsion spring
- Details to follow

2012 RANGER 500 EFI Crew



2012 RANGER 500 EFI



2012 RANGER EV

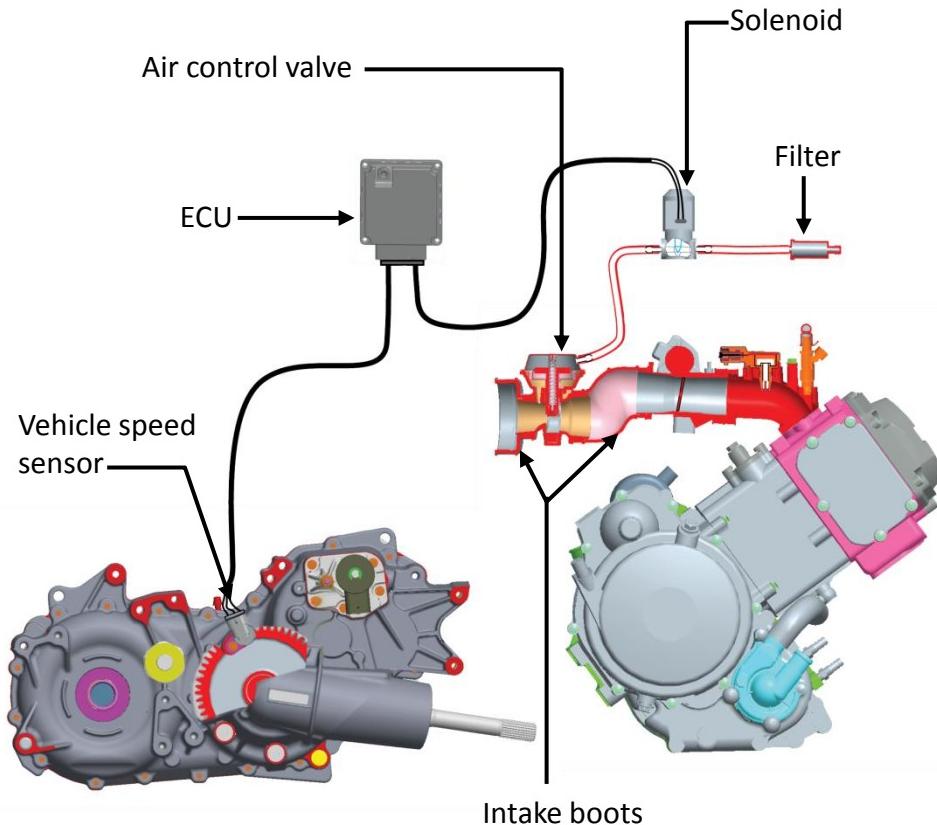
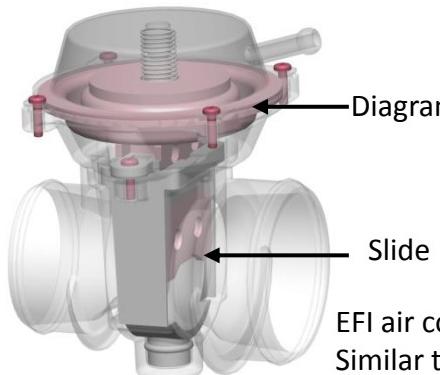


2012 RANGER EV LSV



RANGER 500 EFI and Crew 500 EFI

- Accessory Speed Key Kit 2878400
- Limits vehicle to 25 mph
- Kit contains
 - RF module
 - Key cap with RFID chip
 - Air control valve
 - Inline filter
 - Solenoid
 - Intake boots
 - Hardware
 - Instructions

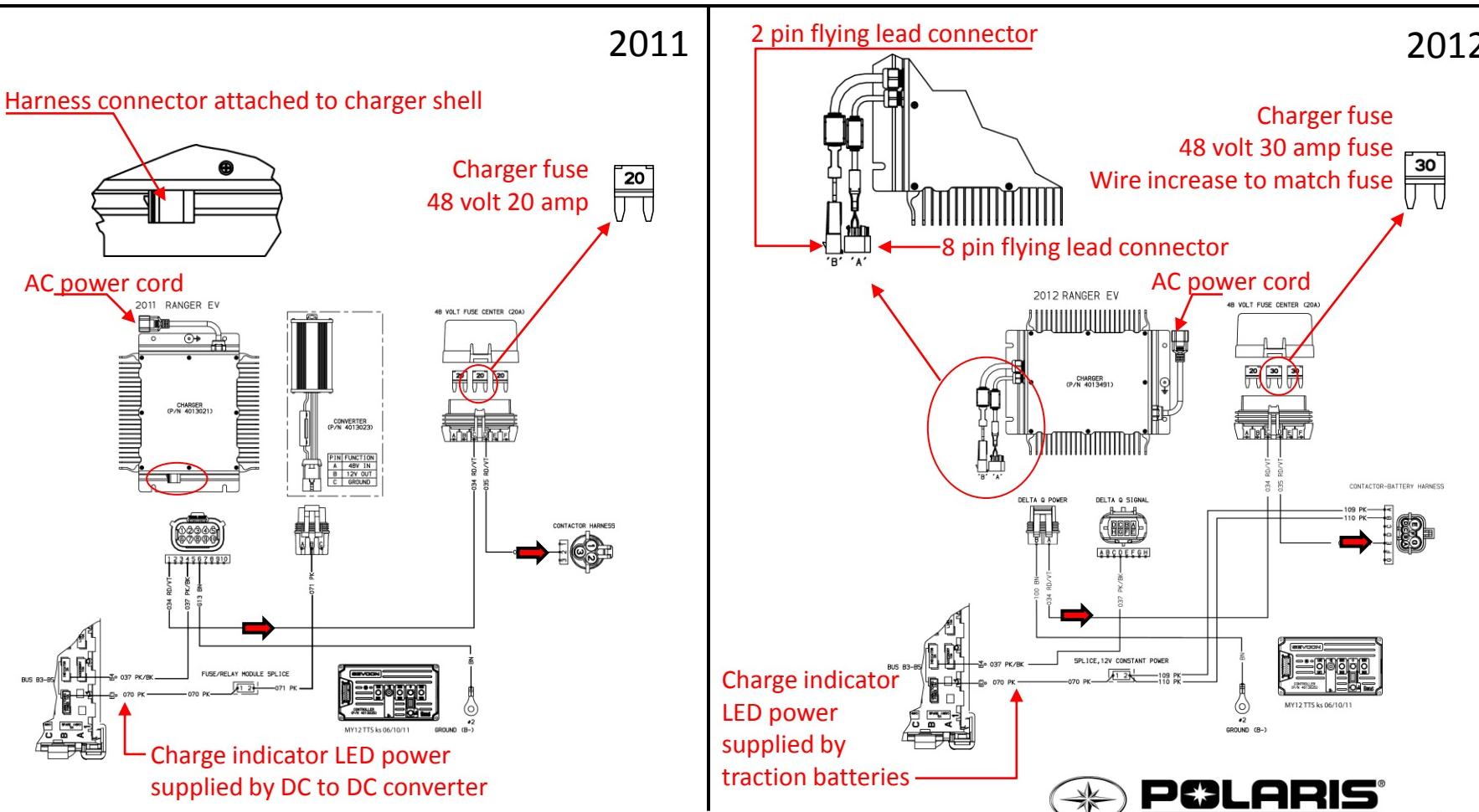


2012 ORV Technical Update

Traction battery charger and charger circuit

RANGER EV/LSV

- New charger
 - 2 Flying leads
 - Robust connections
 - Revised charge indicator circuit
 - Supported by traction batteries
 - Revised charging circuit
 - Increased from 20 to 30 amp circuit

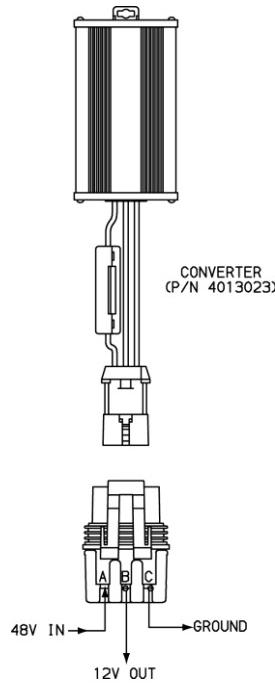


RANGER EV/LSV

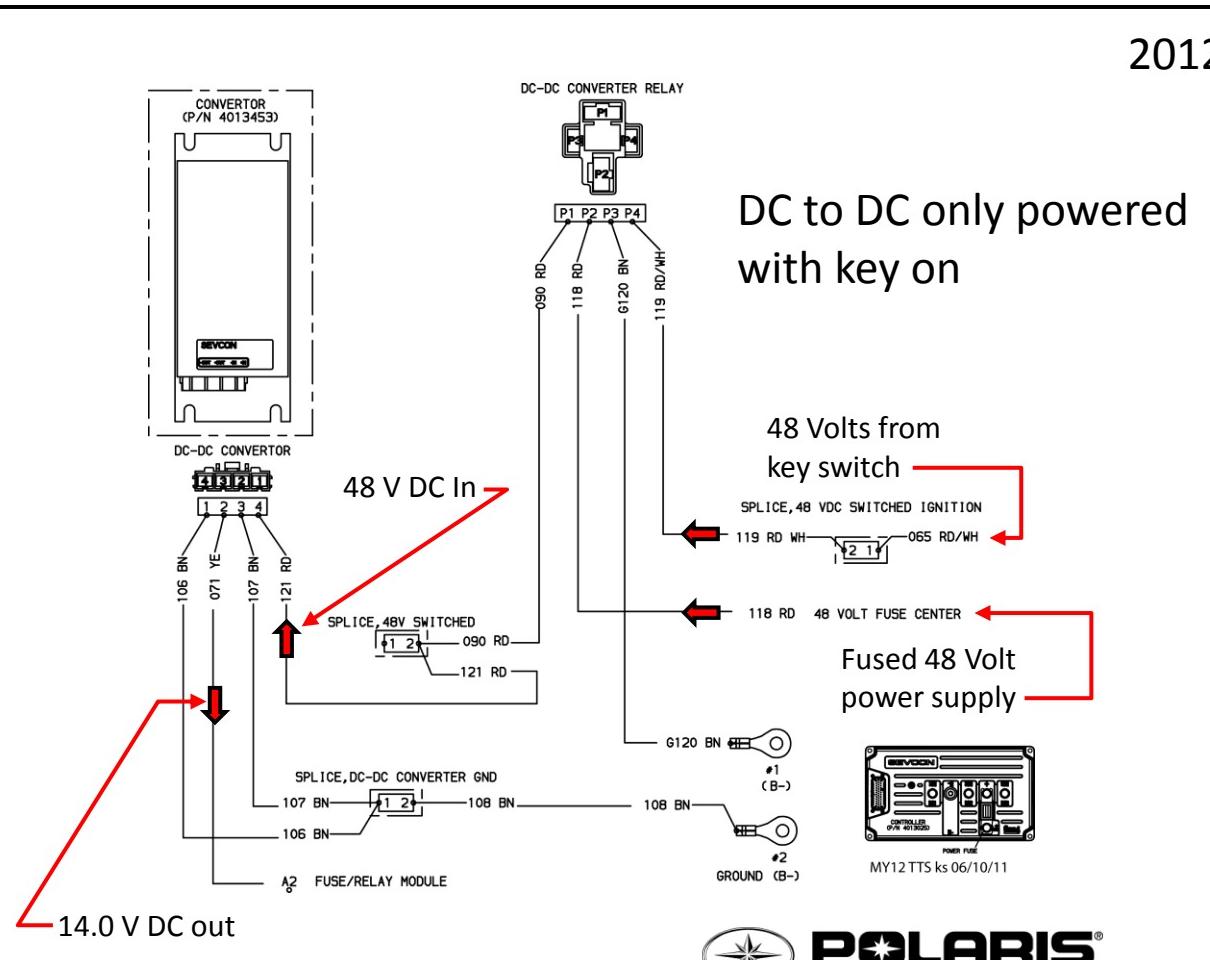
DC to DC Converter circuit

- New converter
 - SEVCON
 - 4 wire
- Added relay
 - 48 volt side
 - Key activated

2011



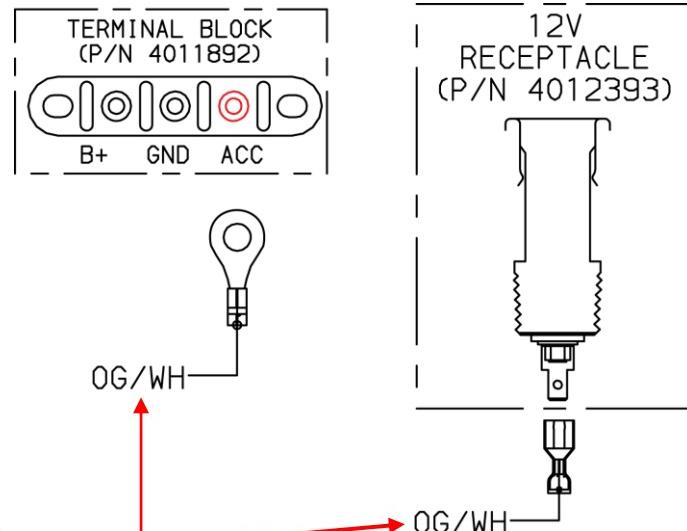
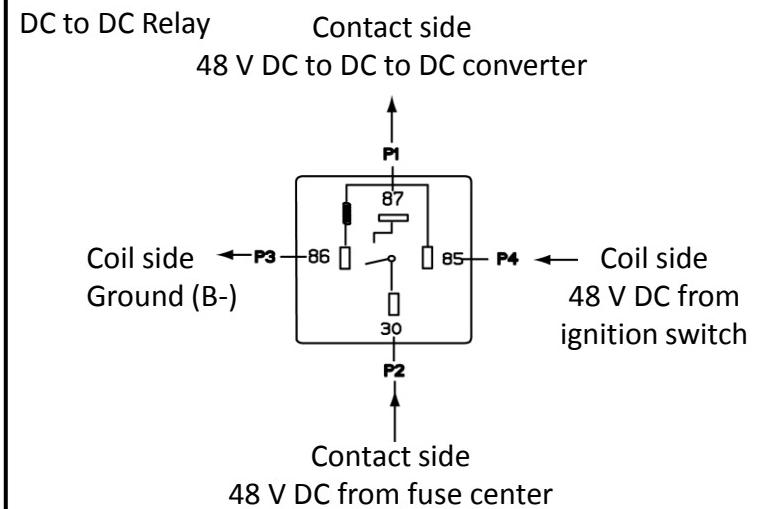
Continuous,
48 volt power supply
12 volt power out



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INDUSTRIES INC.

2012 RANGER EV/LSV

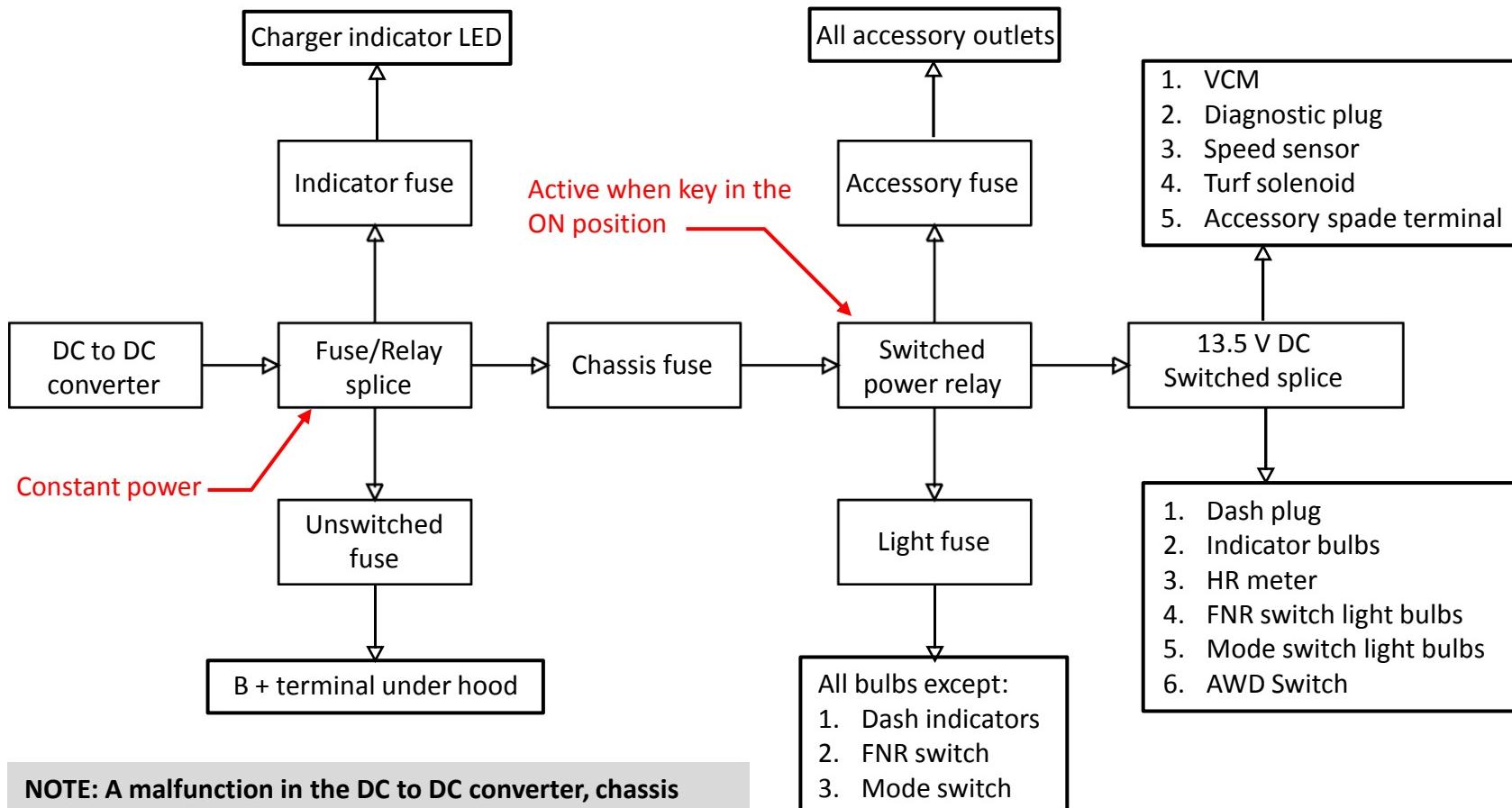
- DC to DC Converter Relay
 - 48 volt coil
 - 48 volt contacts
 - Location
 - Mounted on DC to DC converter bracket
- Key ON
 - Battery to converter relay contact circuit closed
- Key OFF
 - Opens 48 volt battery side of circuit (No 14.0 V DC circuits)
 - No power to accessory circuits



No power with key OFF

2011 RANGER EV/LSV

- 13.5 volt circuit

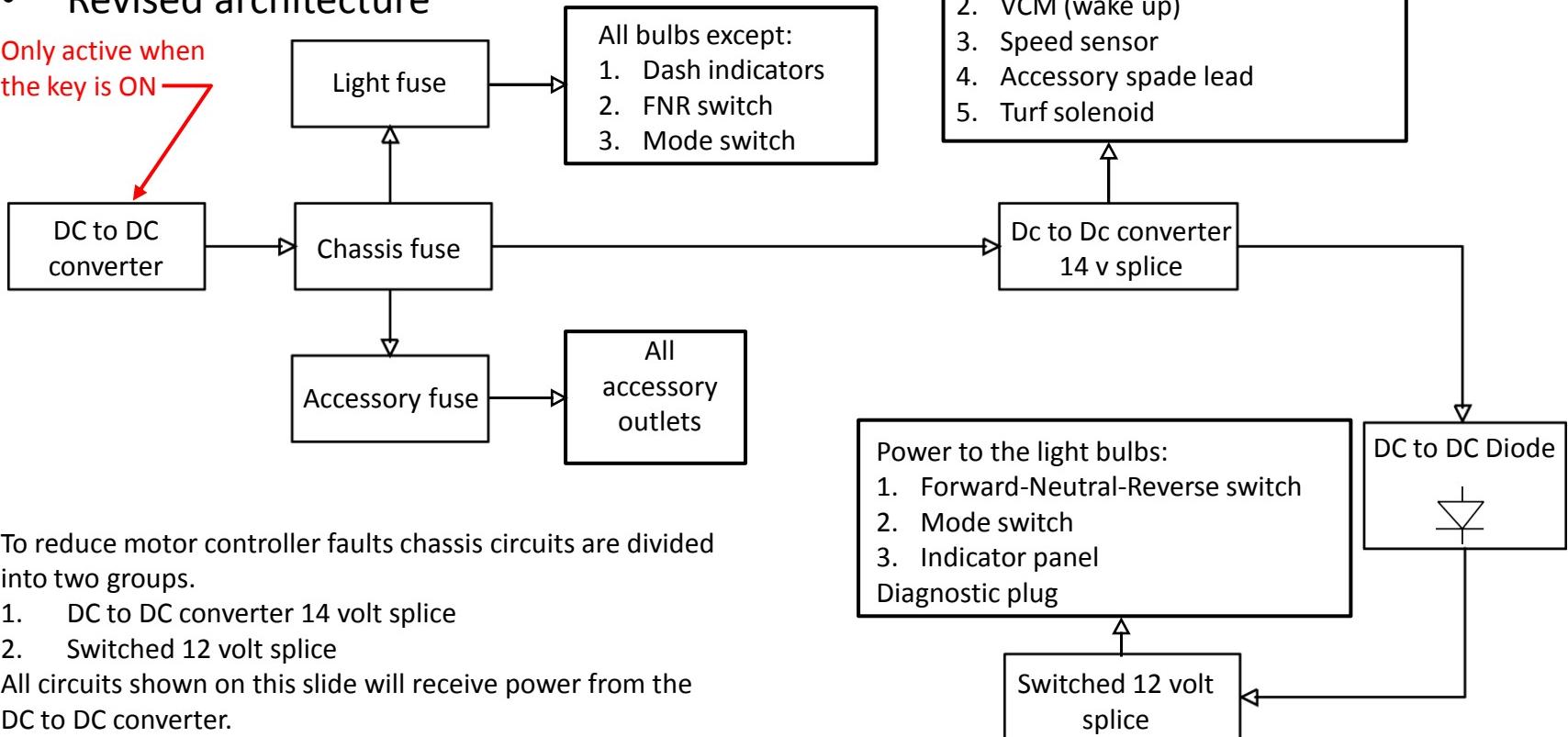


2012 RANGER EV/LSV

14.0 volt circuit

- Revised architecture

Only active when
the key is ON →

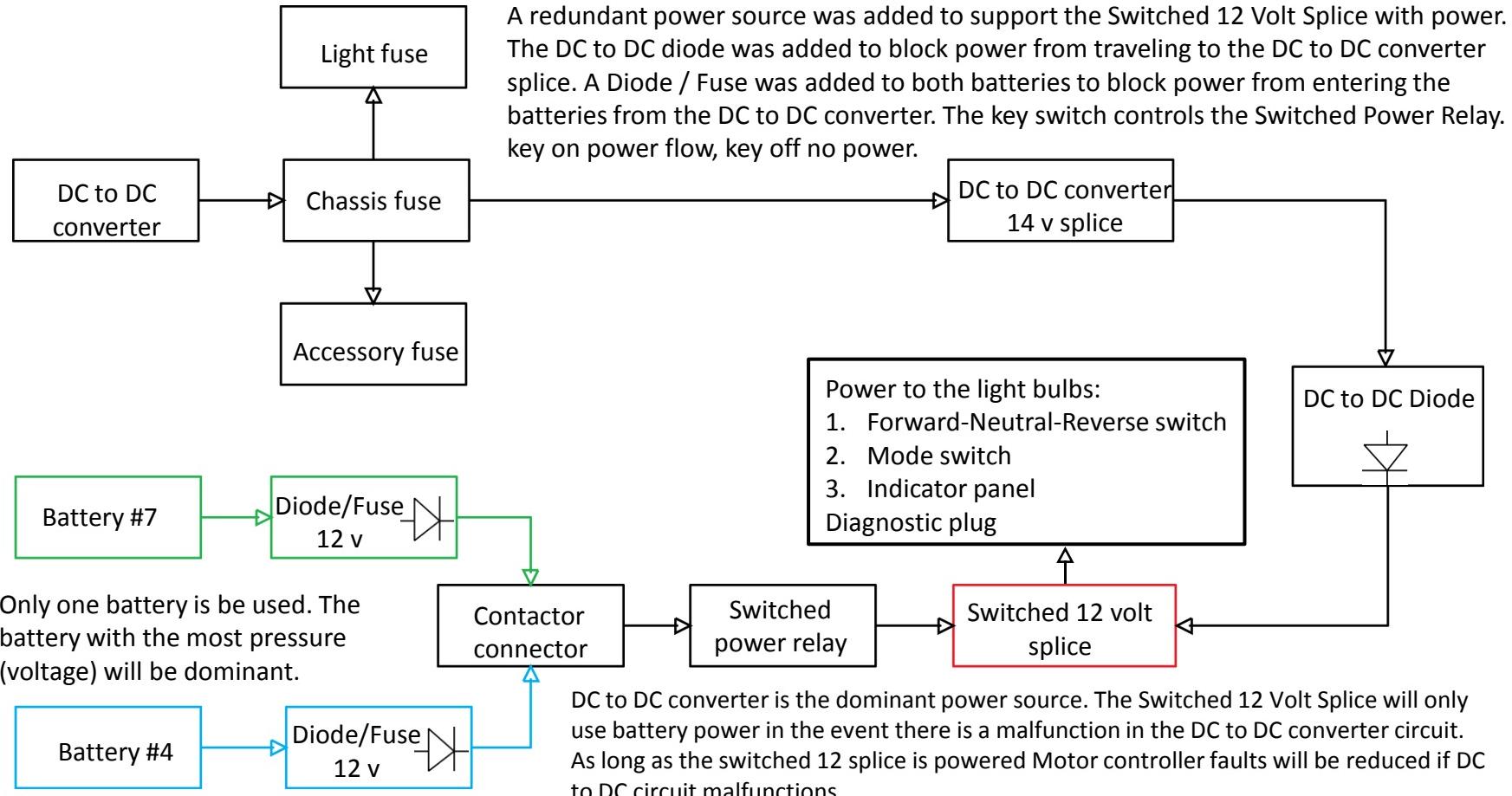


See next slide for more information

2012 RANGER EV/LSV

14.0 volt circuit architecture revised

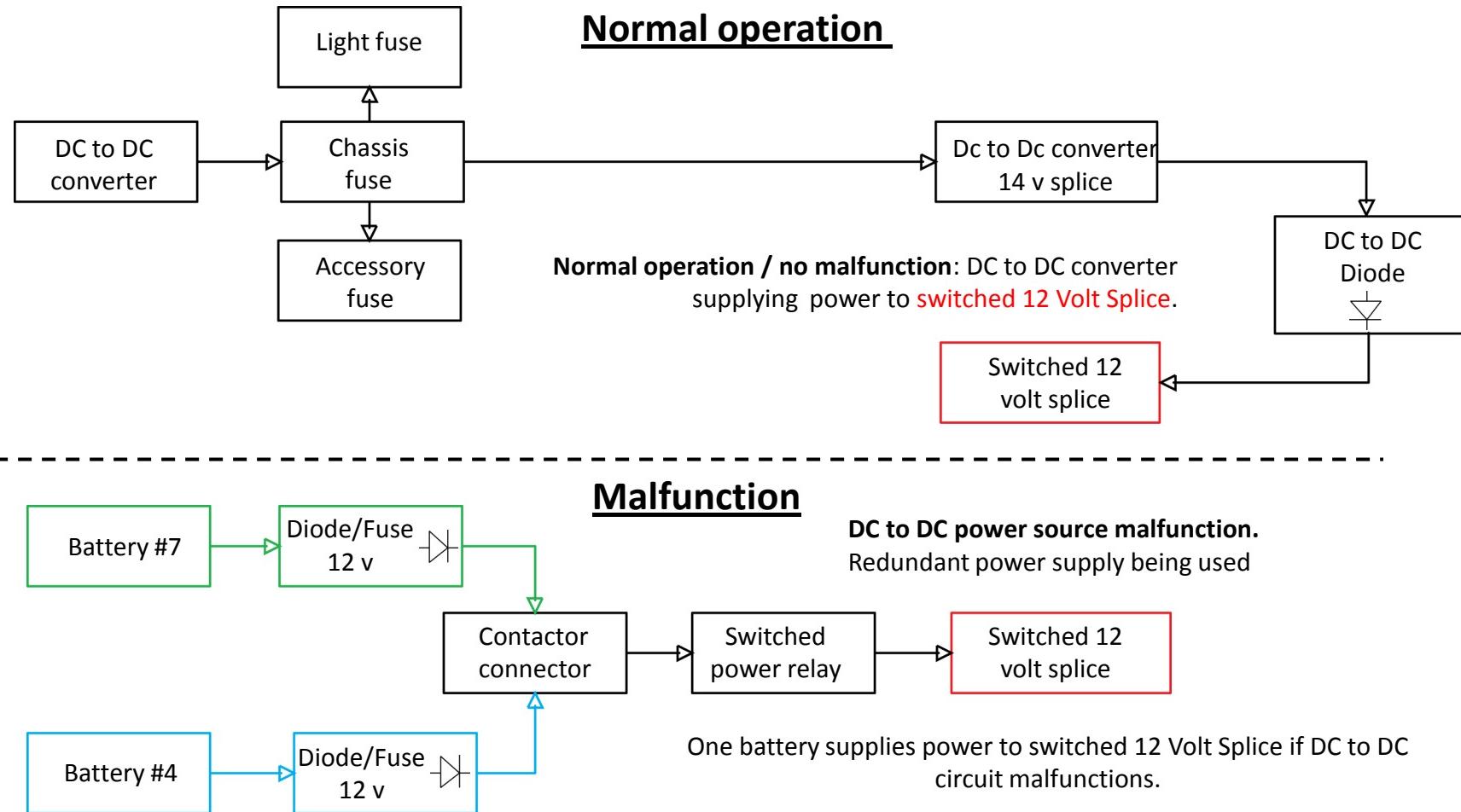
- Redundant power source for Switched 12 Volt Splice



2012 RANGER EV/LSV

14.0 volt circuit

Switched 12 Volt Splice - Power supply circuits comparison



2012 RANGER EV/LSV

- Redundant power supply wiring diagram to contactor plug
 - Each circuit is connected to one battery in each bank (12 volts)
 - Each circuit contains a diode and 2 amp 12 volt fuse

Green line —

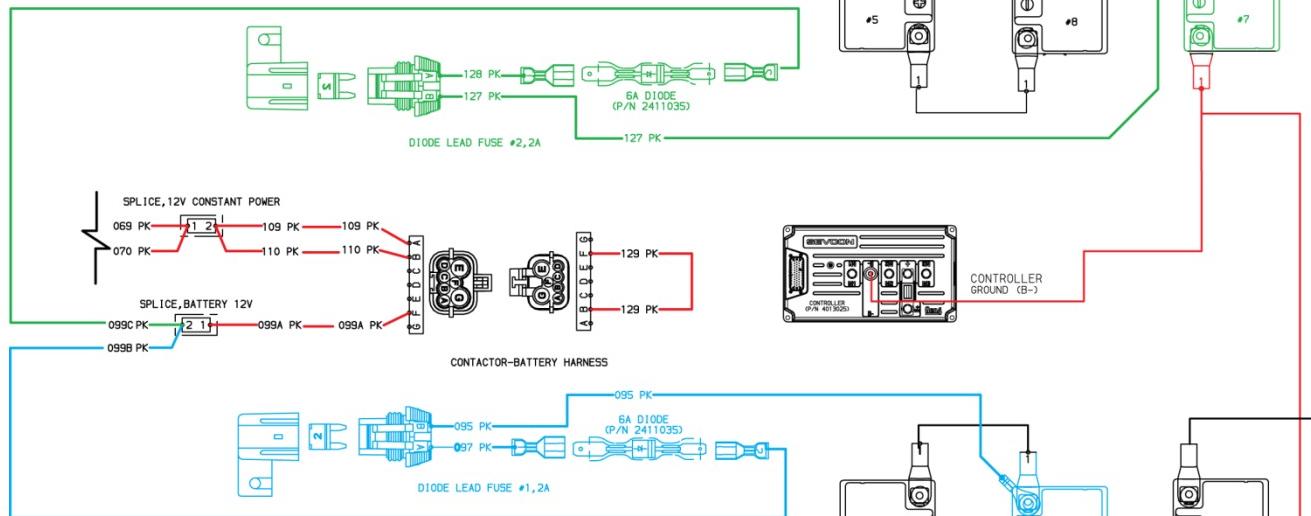
Bat # 7

Blue line —

Bat # 4

RED line —

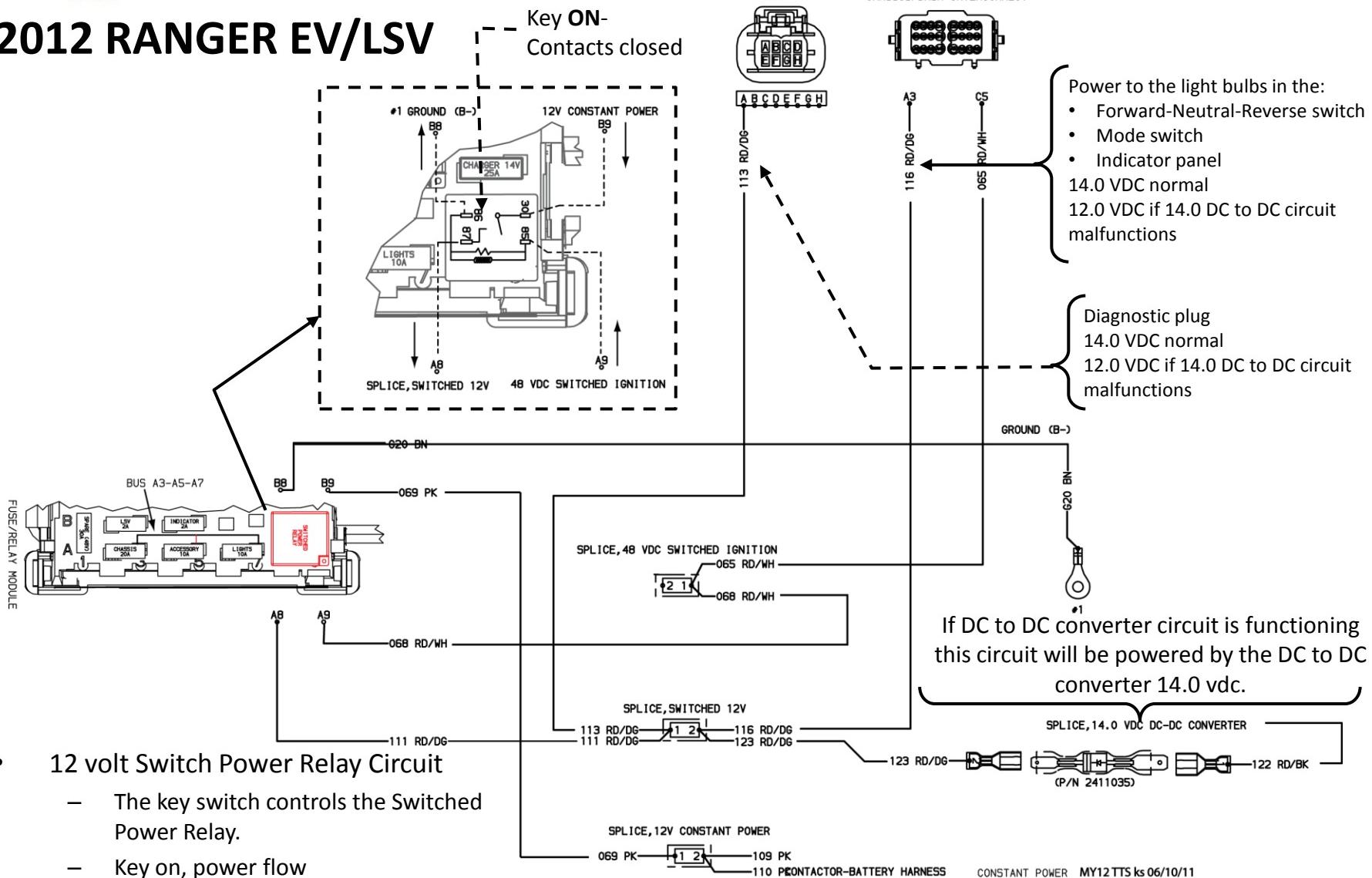
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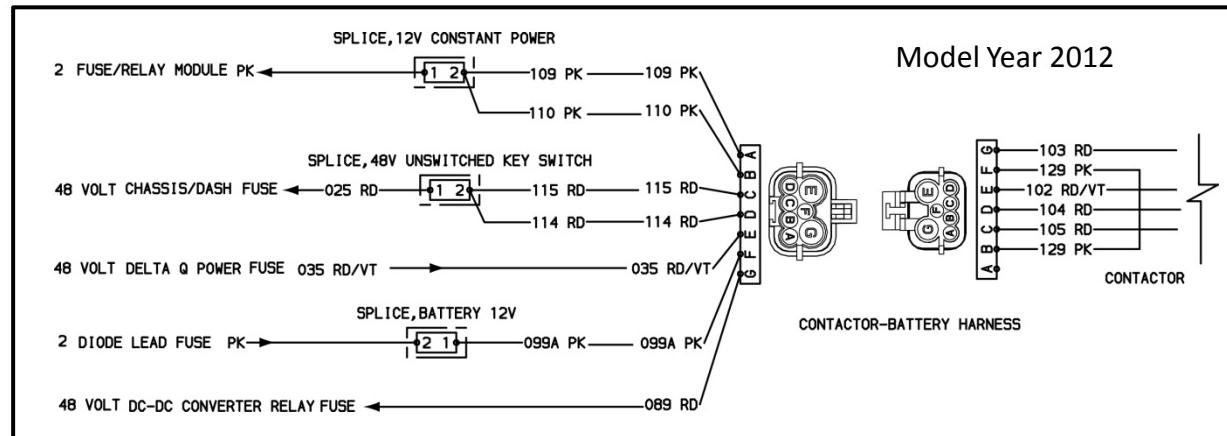
- Function / feature

- Provides constant 12 V DC to LSV 2 Amp fuse circuit and Charge Indicator fuse circuit.
- Default power supply to light bulbs in: (only if DC to DC circuit malfunctions)
 - Forward-Neutral-Reverse switch
 - Mode Switch
 - Indicator panel
 - Diagnostic plug

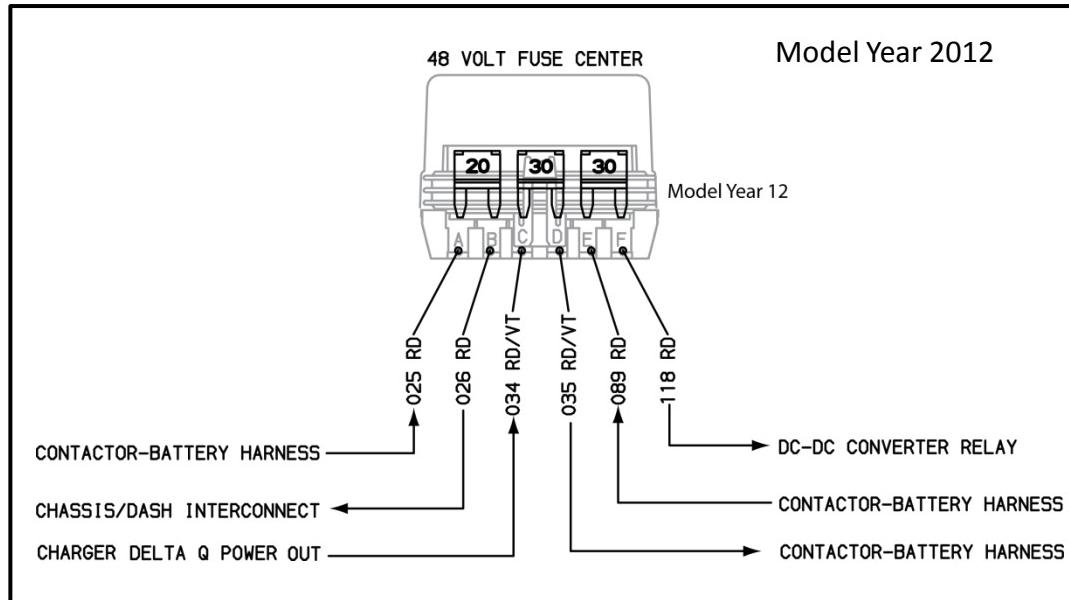
2012 RANGER EV/LSV



RANGER EV/LSV

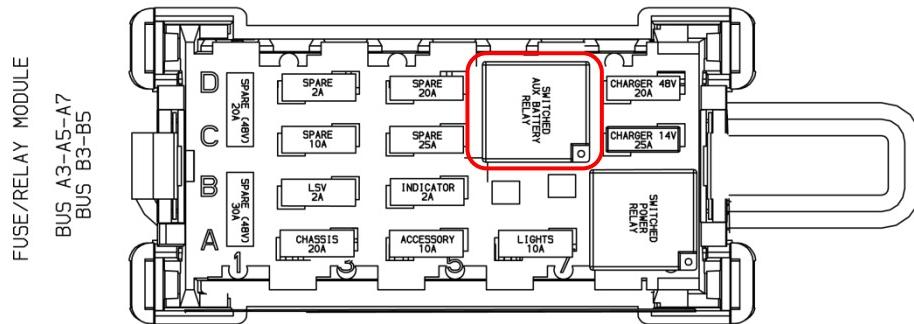


- Revised contactor connector
- Added the Diode leads
 - 7 pin
 - Pin C, D, E, and G are 48 volts
 - Pin A, B, and F are 12 volts
 - Constant power
- 48 volt fuse box 2012
 - 1- 48 volt 20 amp fuse
 - Dash
 - 2 - 48 volt 30 amp fuses
 - Traction batteries charge
 - DC to DC converter primary power



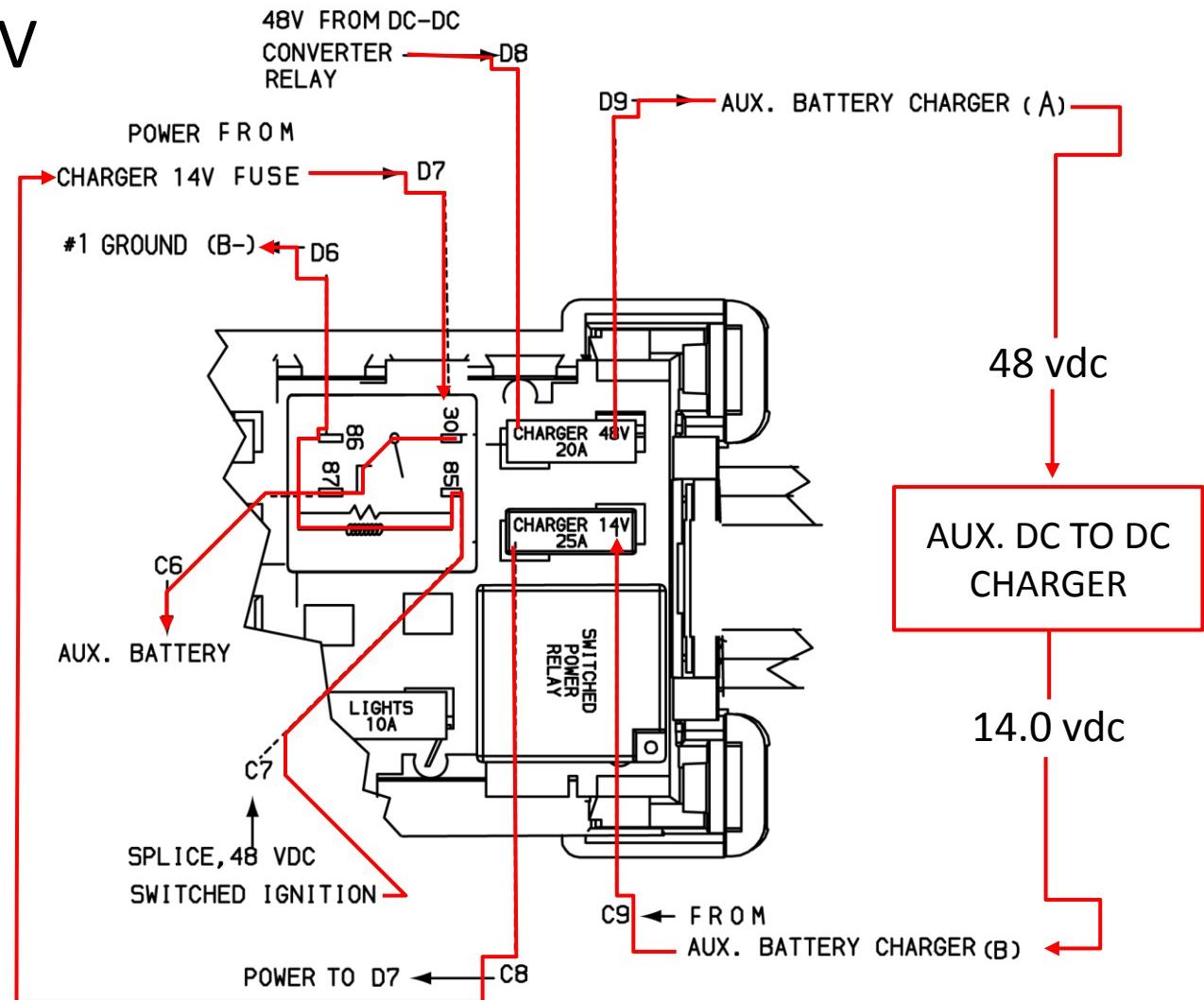
RANGER EV/LSV

- Auxiliary battery relay circuit
- Key **ON**
 - **Auxiliary relay** closed. Power, 14.0 volts from the auxiliary DC to DC converter to **auxiliary batteries.**
 - **DC to DC relay** closed. Allows 48 volts to **auxiliary battery DC to DC converter.**
- Key **OFF**
 - **Auxiliary relay** open. Open circuit between DC to DC converter 14.0 volts, to auxiliary batteries.
 - **DC to DC relay** open. Open 48 volt circuit to auxiliary battery DC to DC converter.



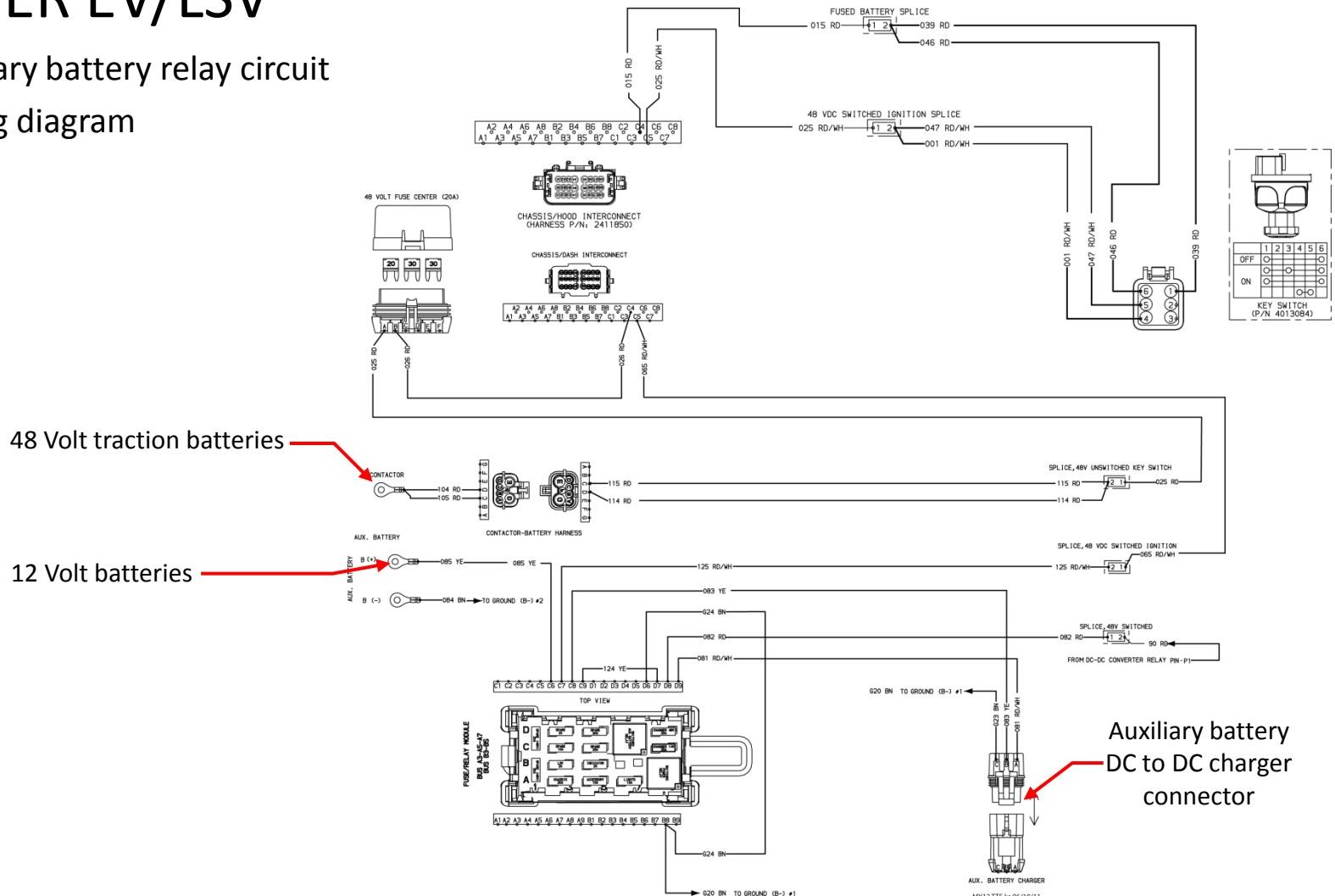
RANGER EV/LSV

- Auxiliary battery relay
- Power flow
 - Key ON red line



RANGER EV/LSV

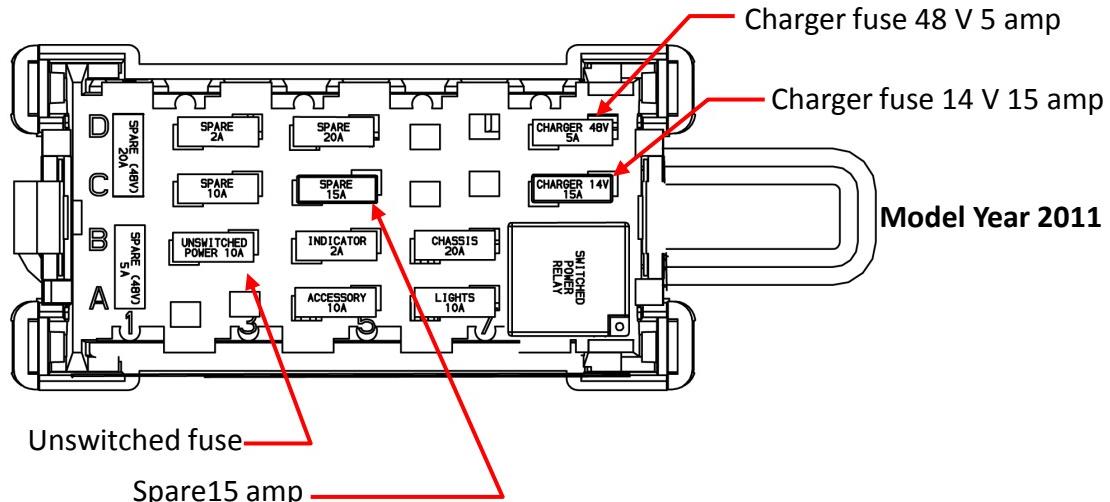
- Auxiliary battery relay circuit
- Wiring diagram



RANGER EV/LSV

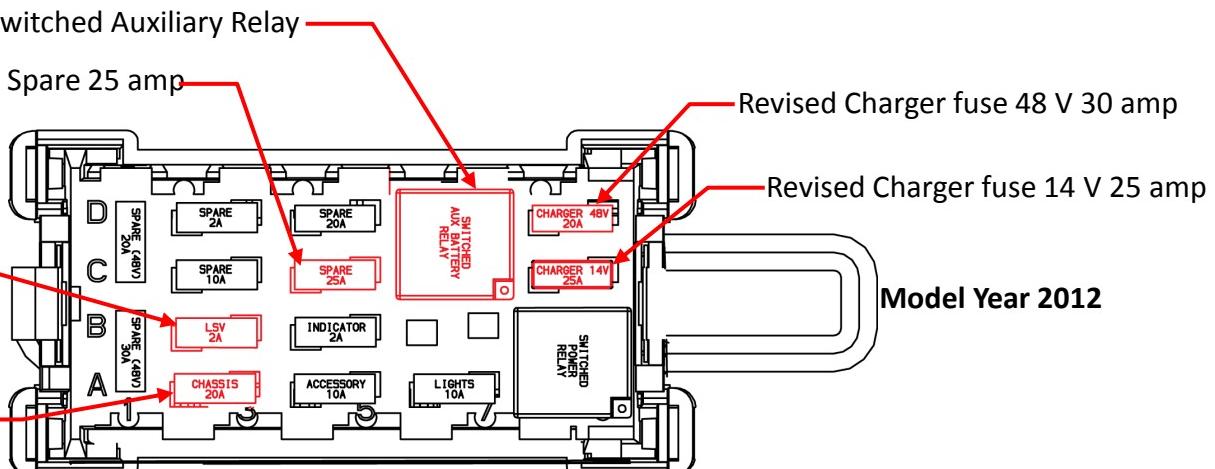
- Fuse box changes
- 2011 to 2012
- Increased wire to match fuse

Red outline indicates change between previous model years



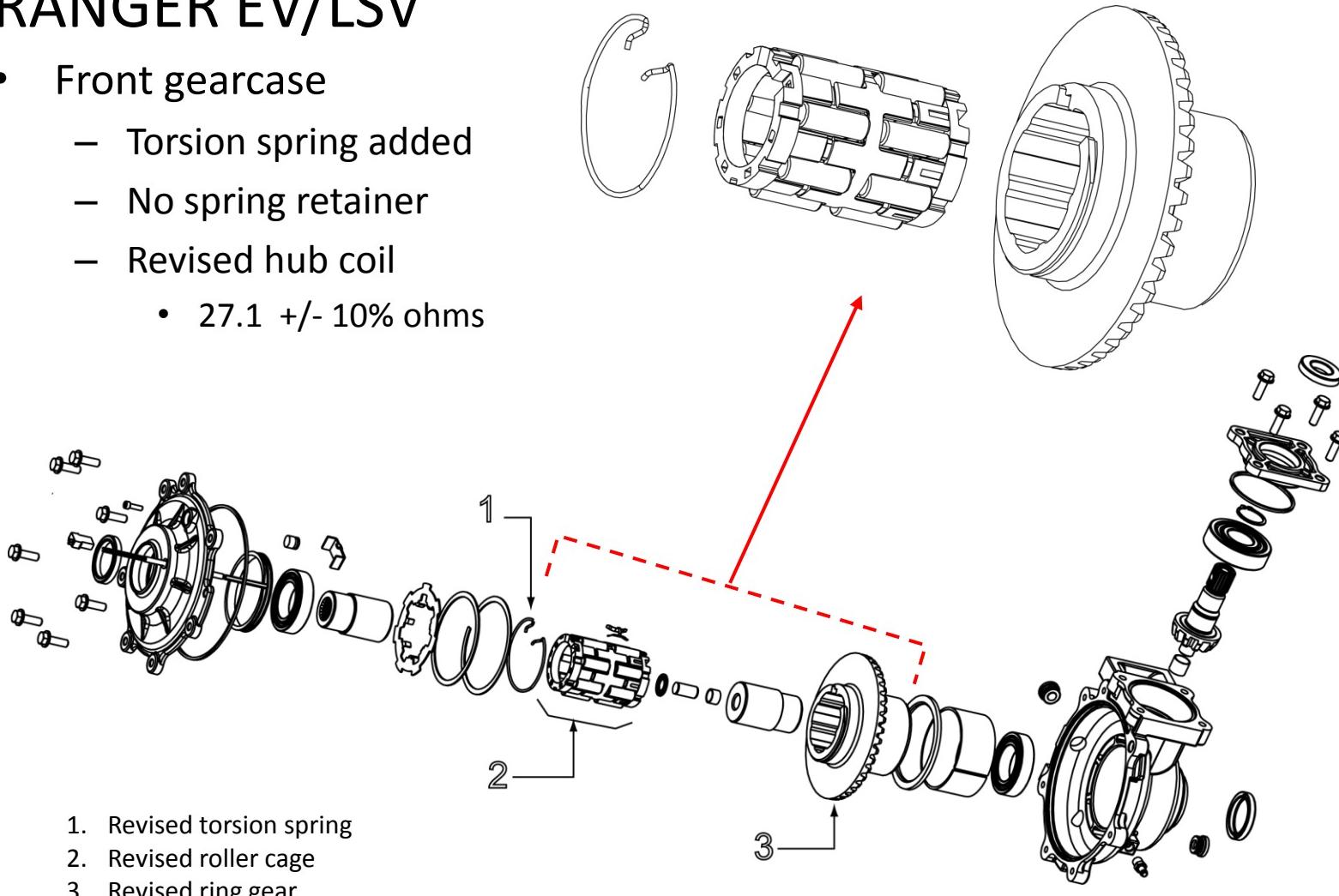
LSV fuse provides constant power for hazard signals

Added Chassis fuse 14 v 20 amp



RANGER EV/LSV

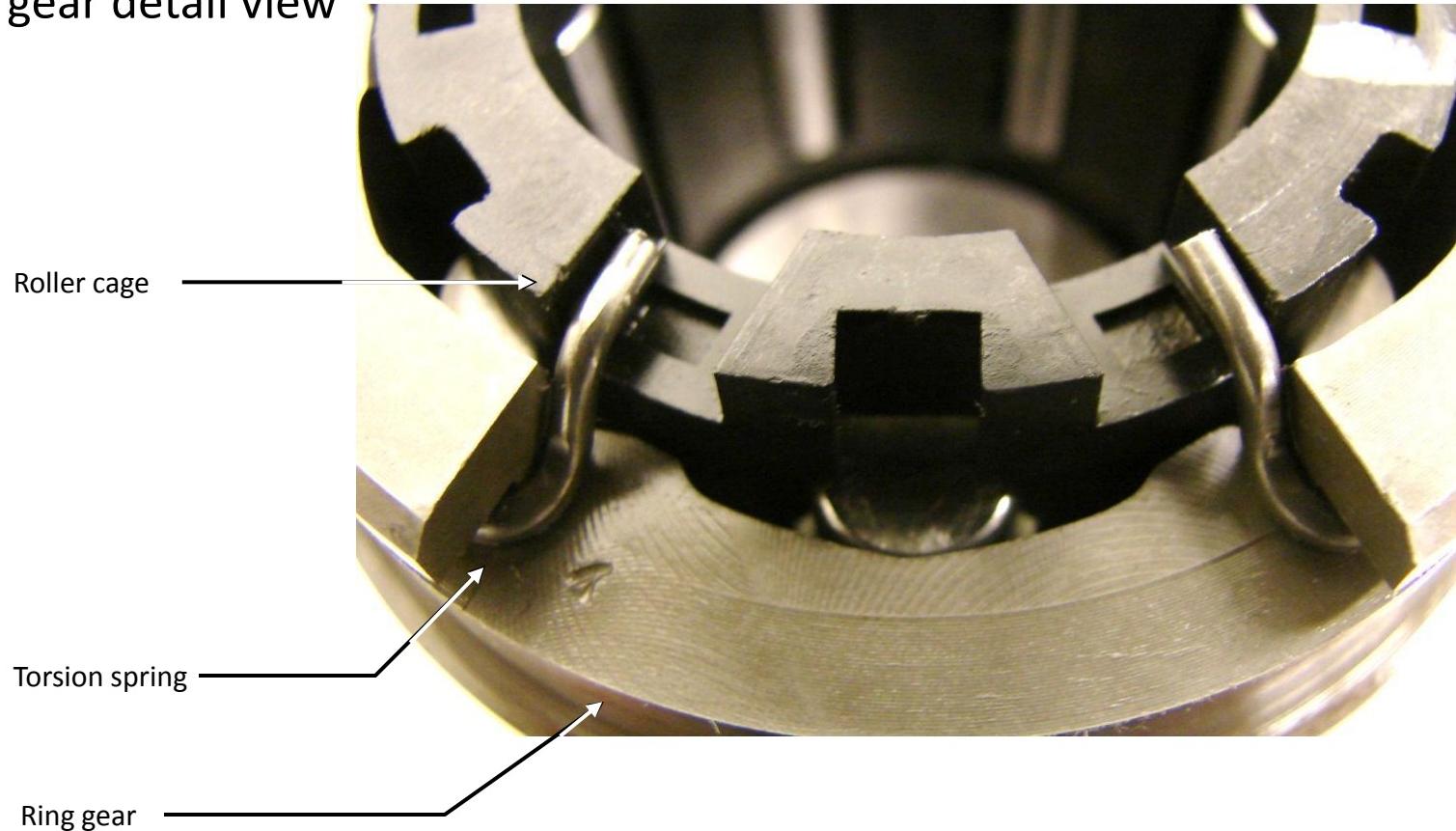
- Front gearcase
 - Torsion spring added
 - No spring retainer
 - Revised hub coil
 - $27.1 \pm 10\%$ ohms



1. Revised torsion spring
2. Revised roller cage
3. Revised ring gear

RANGER EV/LSV

- Ring gear detail view



RZR

- What changed?
 - New model
 - RZR 570
 - New engine
 - Revised chassis
 - All RZR models
 - Gear selector
 - 2 wire (identical to RANGER 800)
 - Removable front grille
 - Decreased cab water and dust intrusion
 - Revised passenger grab tube
 - Common seat belt with full size RANGER
 - Common master cylinder with RZR XP
 - Shocks
 - RZR S LE - FOX shocks
 - RZR 4 and RZR XP - FOX shocks with tool-less clickers
- All RZR 800
 - Revised rear gearcase
 - Revised drive clutch spring
- RZR 50" (127 cm)
 - Revised spark arrestor
 - Revised sway bar
- RZR XP
 - Splice less belt
 - Revised prop shaft
 - Revised A-arm
 - Reduced steering effort
 - Revised front wheel bearing carrier
 - Revised coolant surge tank and filler neck
 - Reduced water intrusion
- RZR XP International
 - Revised gearcase with differential
 - External mechanical park brake
 - EPS standard
 - Front sway bar standard

RZR 570

Features

- Trail Capable 50" Wide
- True On-Demand AWD
- 10" Ground Clearance
- 9.5" Suspension Travel
- ProStar 570 Engine
 - 45 Horsepower
 - Single Cylinder 567cc
 - 4 Valve DOHC Wet Sump
 - 650 Watts

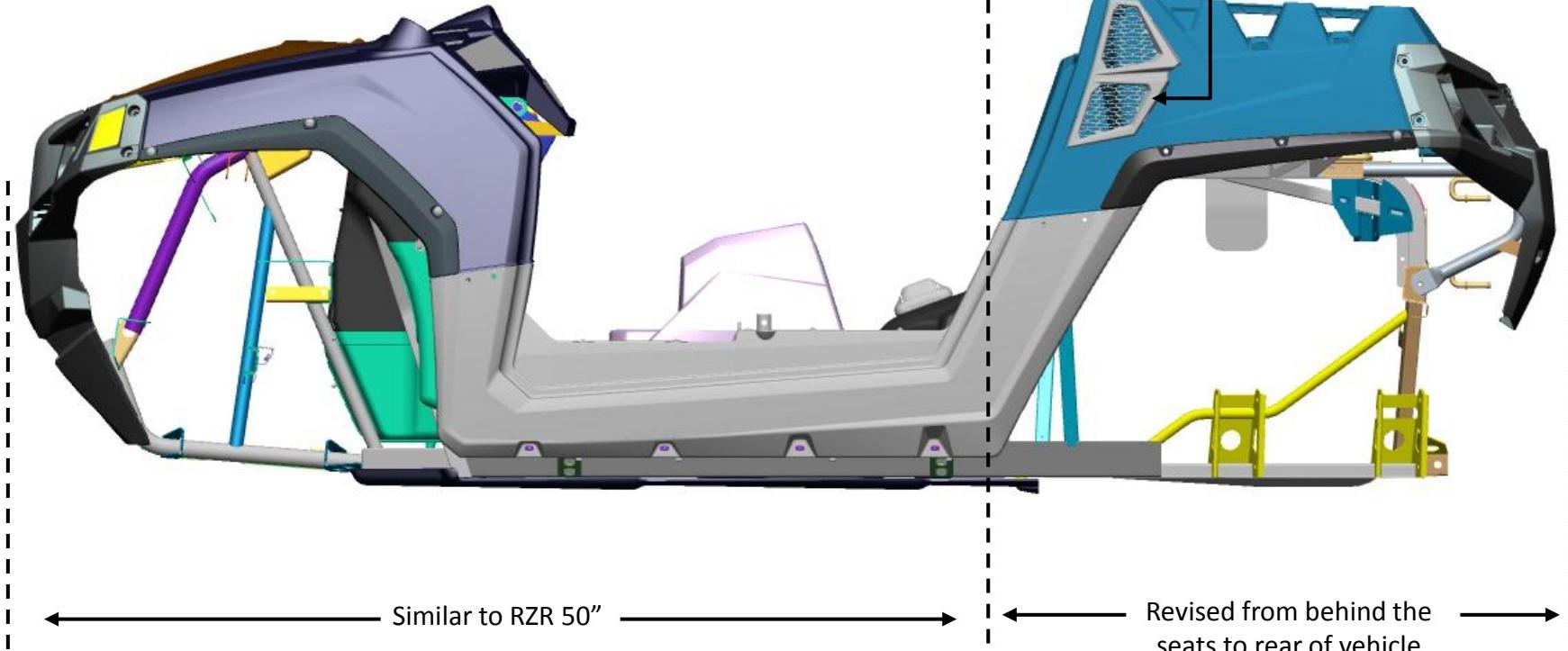
RZR XP Style GearCase

- Helical Cut Gears
- Low Friction Bearings
- No Power-robbing right angle drives
- Compact design



RZR 570

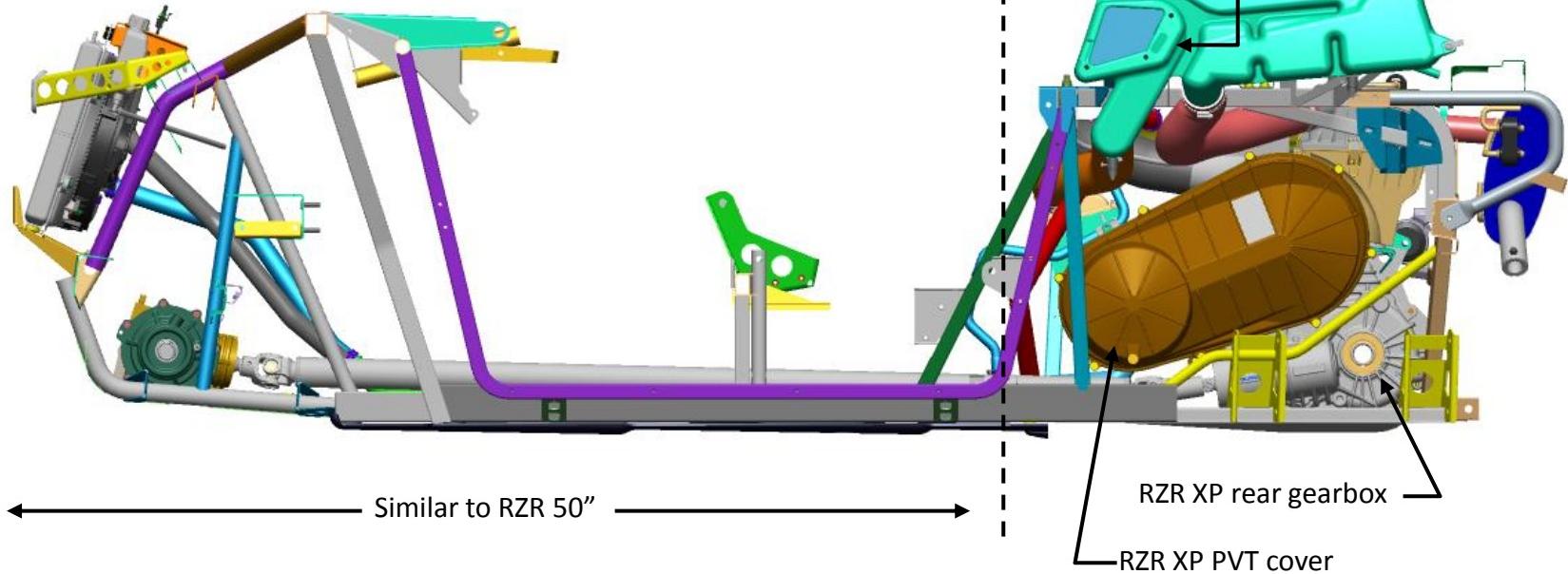
- RZR 570 Chassis



RZR 570

- RZR 570 Left side view
 - Plastic removed

Similar to RZR XP

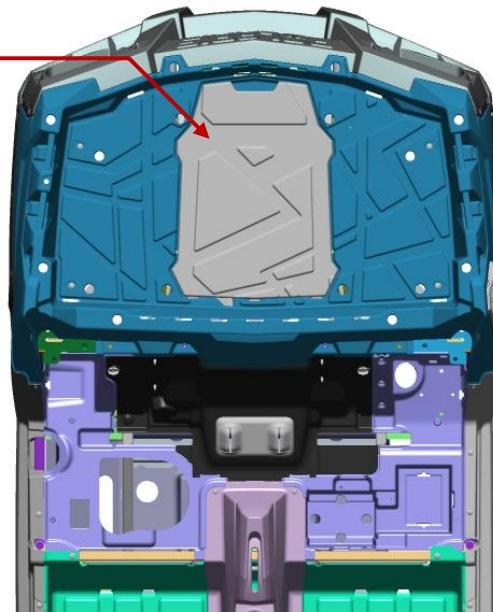


RZR 570

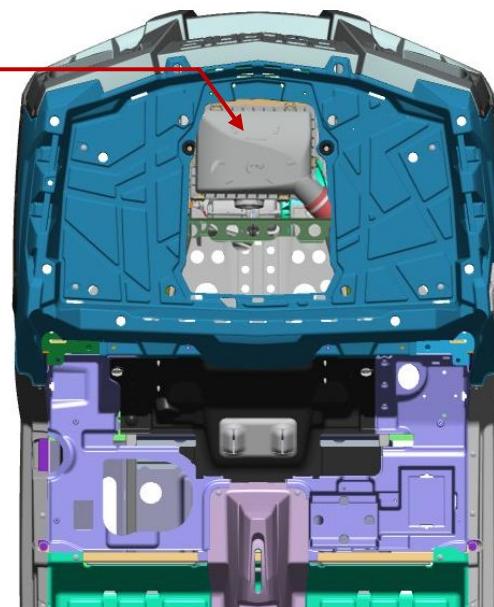
- Inspection panel removal
 - Provides easy access to air filter
 - New air filter design

Removal panel

Similar to RZR XP



Air box assembly



RZR 570

- Lay out

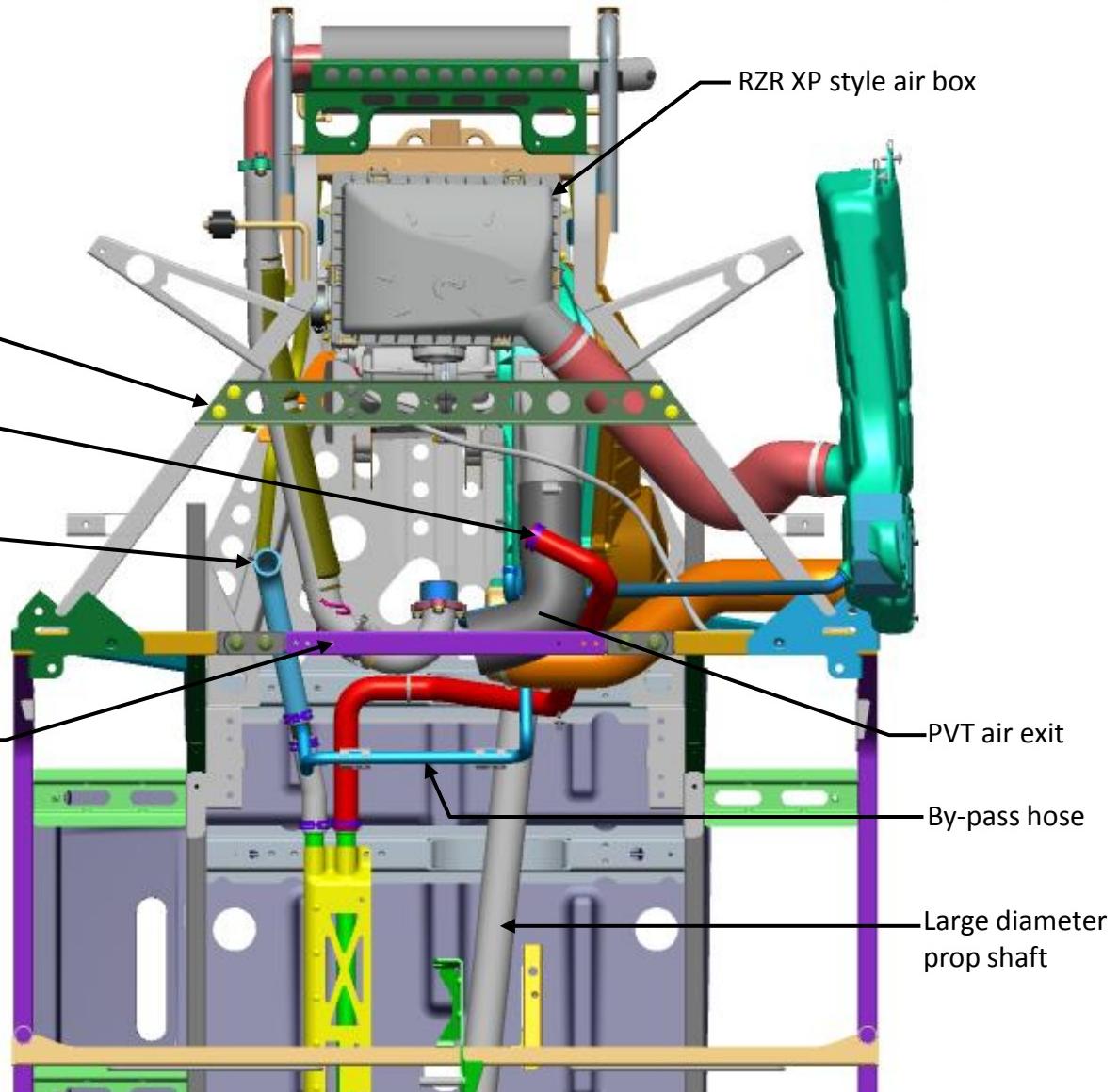
Removable frame section

Thermostat housing hose

Water pump hose

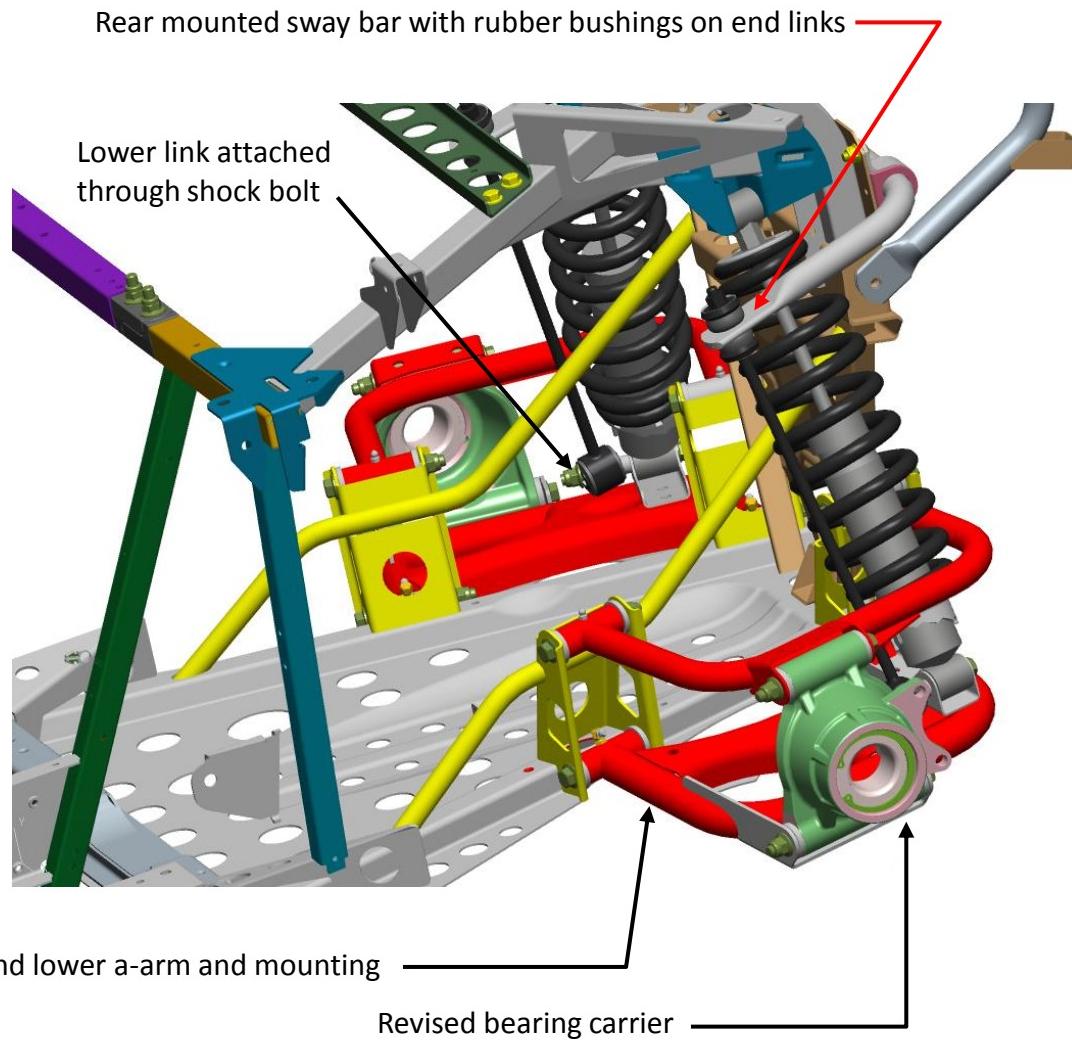
Removable frame section

RZR XP style air box



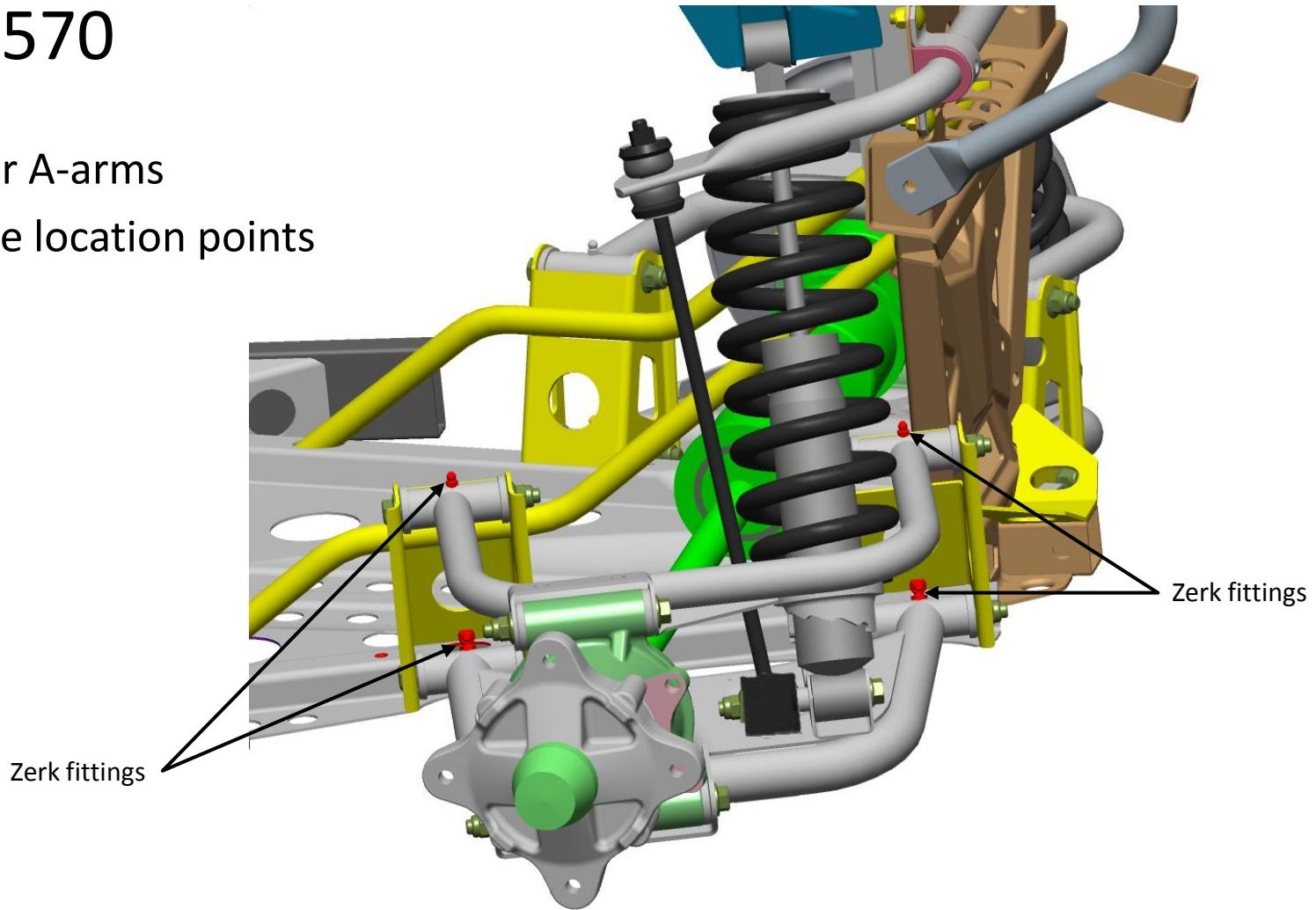
RZR 570

- Rear suspension
 - A-arm mounting
 - Sway bar mounting



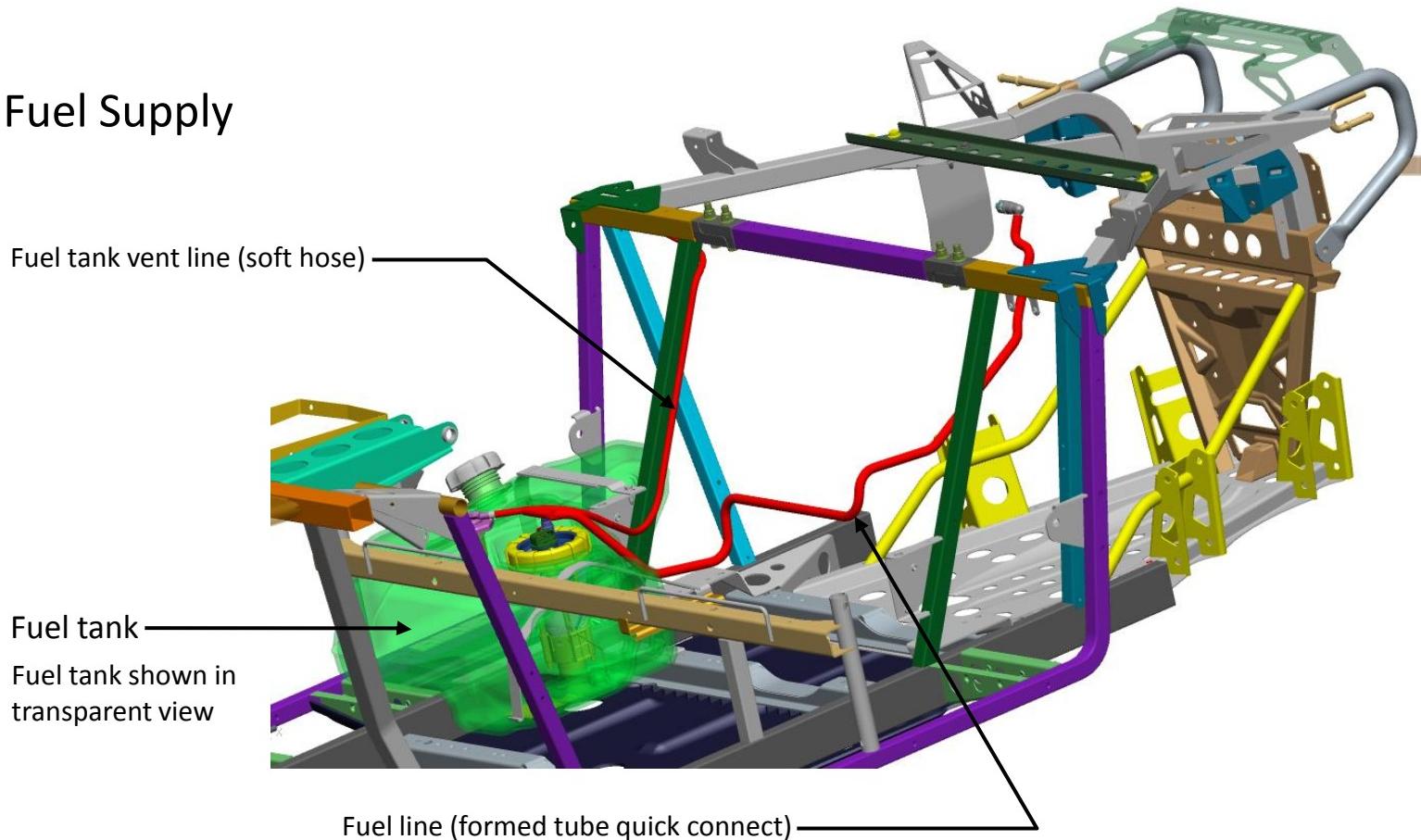
RZR 570

- Rear A-arms
- Lube location points



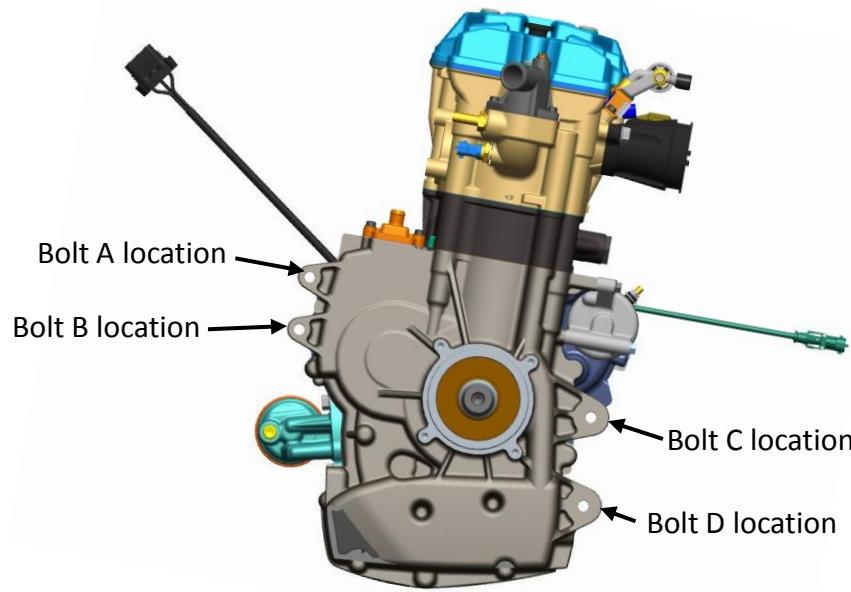
RZR 570

- Fuel Supply

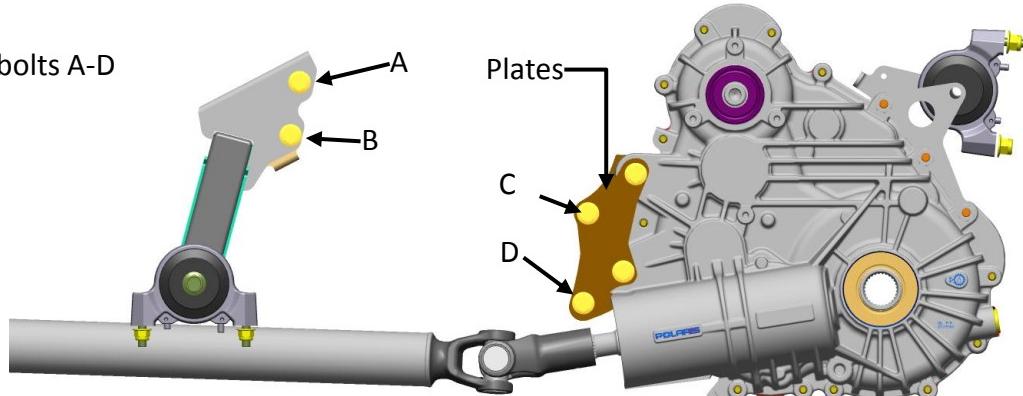


RZR 570

- Engine mounting
- PTO side view
 - Through-bolt design
 - Plates

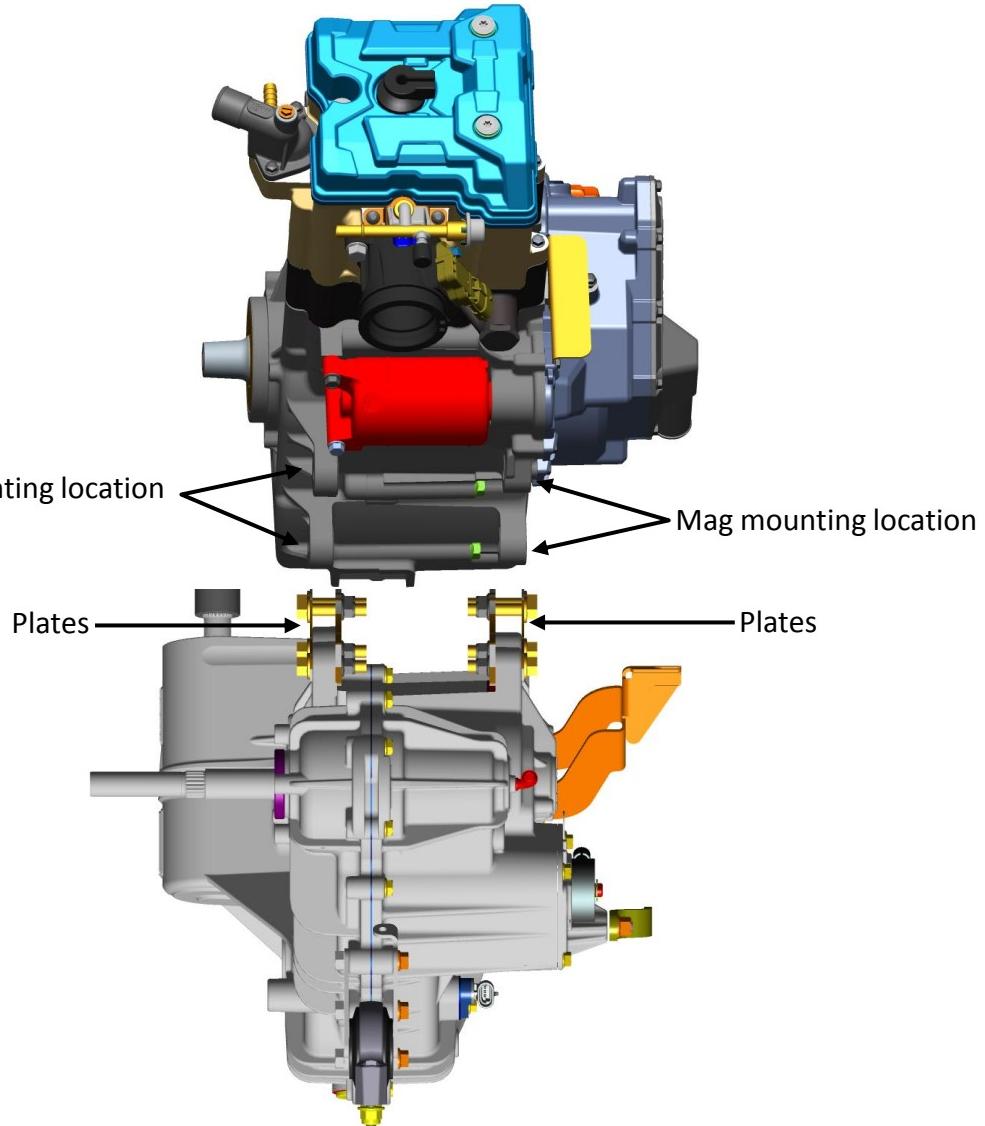


Engine mounting bolts A-D



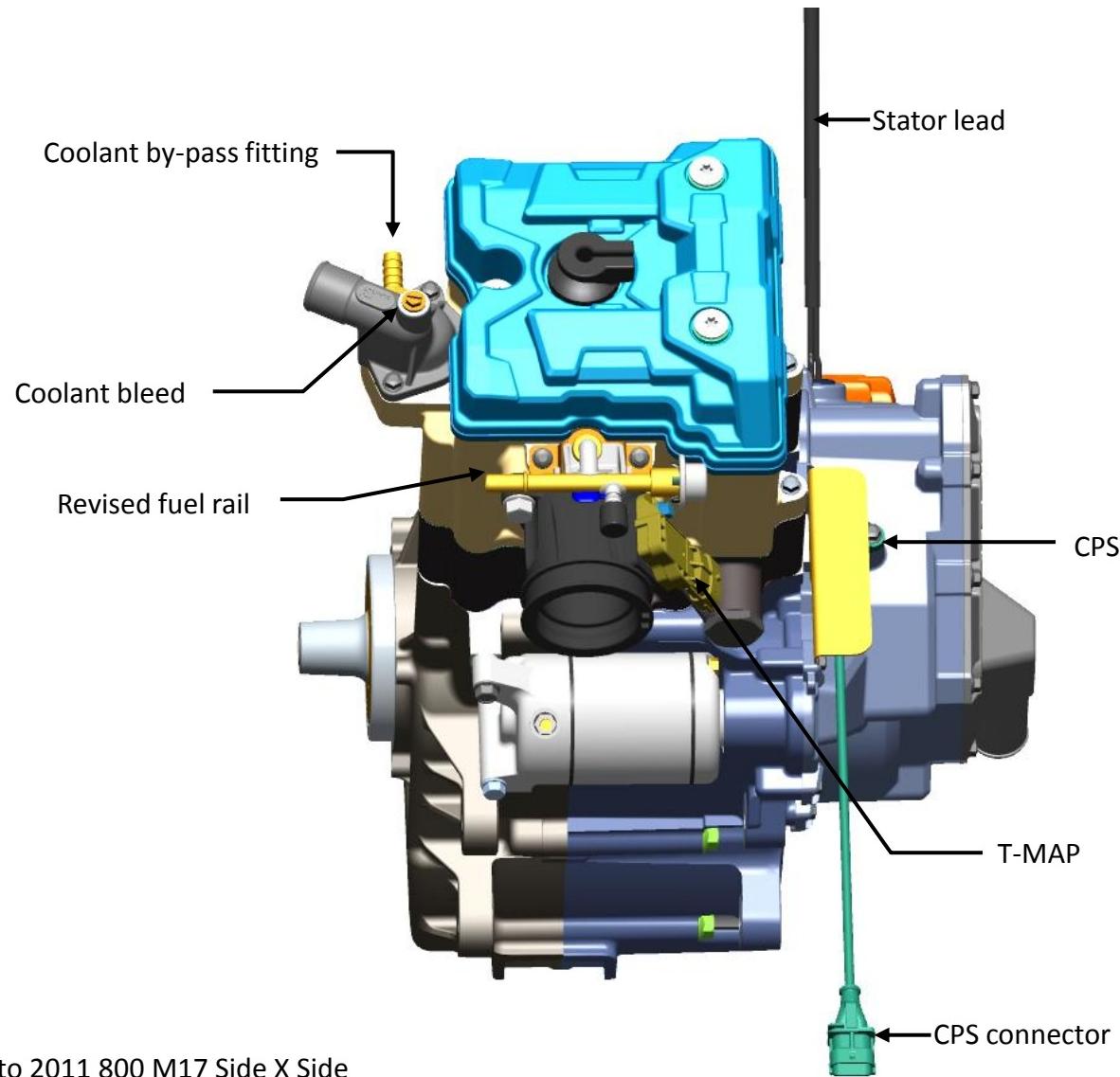
RZR 570

- Engine mounting
- Top view
 - No joint
 - Plates sandwich components
 - Gearcase
 - Engine case



RZR 570

- Engine layout

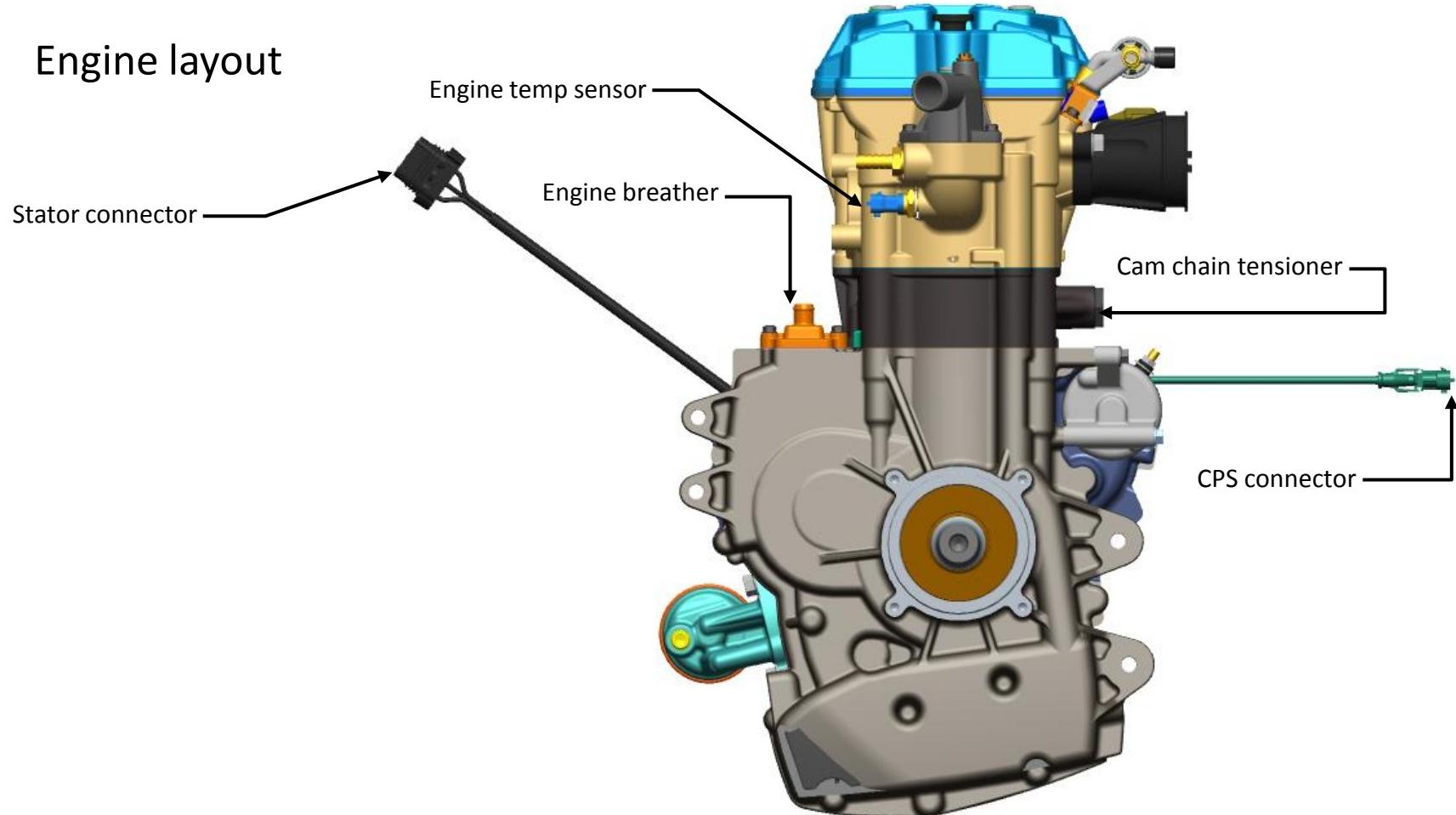


Throttle body not illustrated

- Revised throttle body similar to 2011 800 M17 Side X Side
- IAC and TPS common with 2011 800 M17 Side X Side

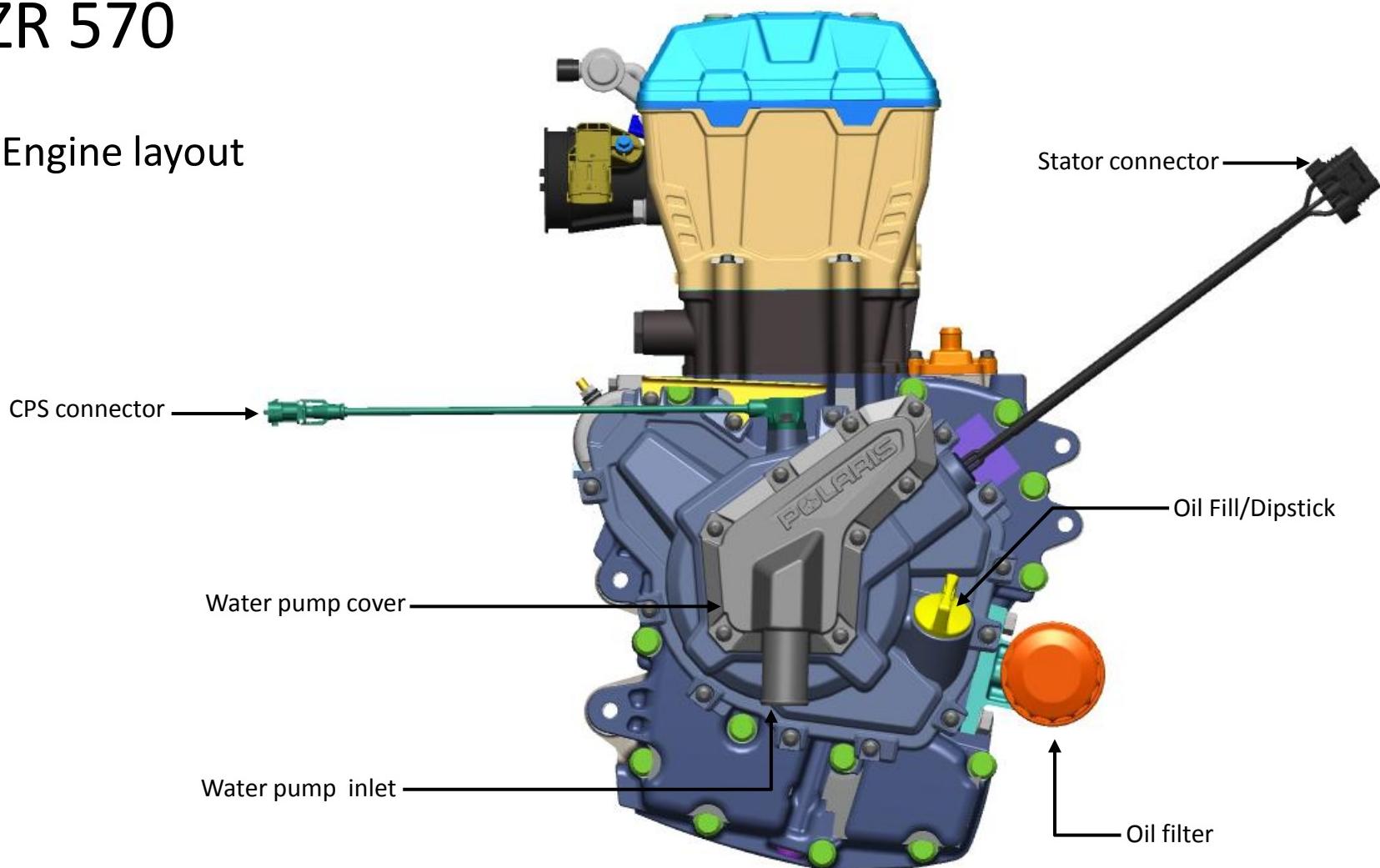
RZR 570

- Engine layout



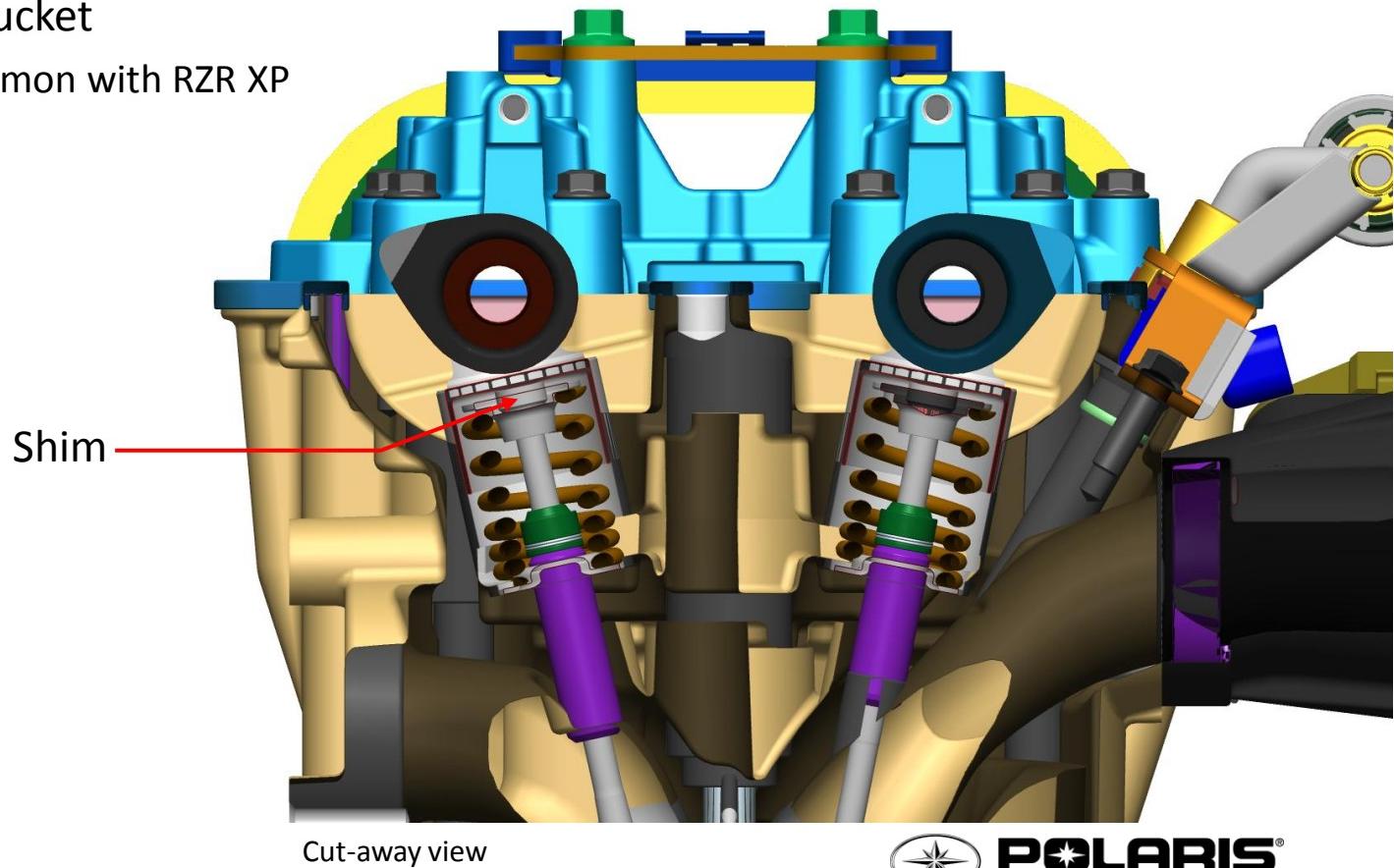
RZR 570

- Engine layout



RZR 570

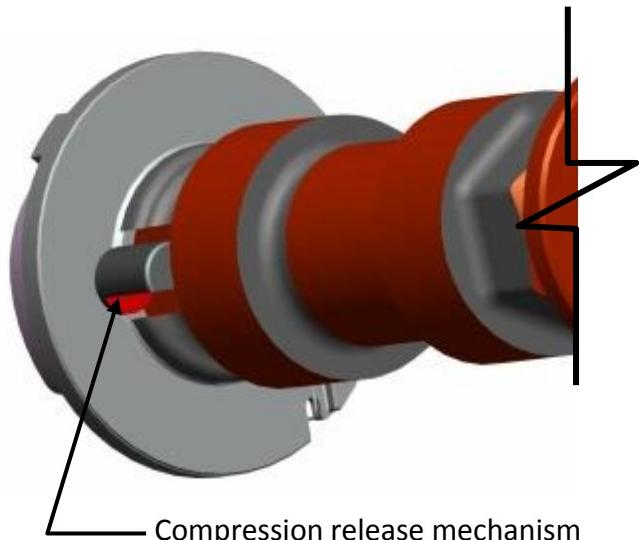
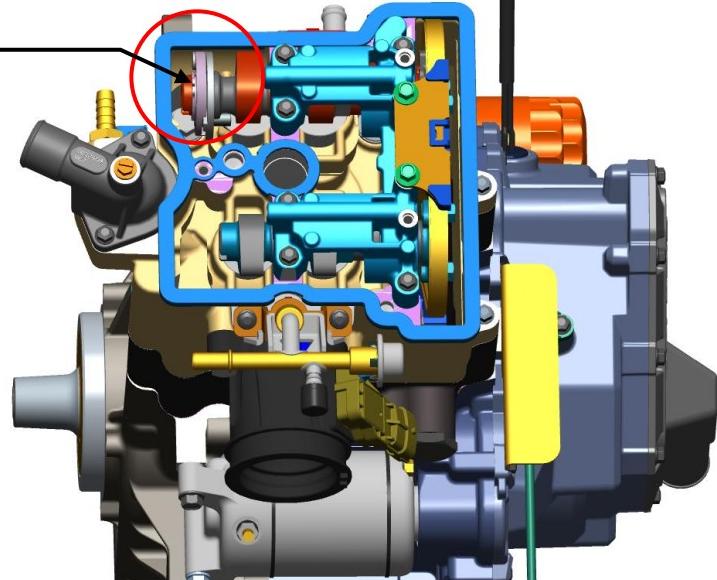
- Top end
- Dual overhead camshafts
- Shim under bucket
 - Shims common with RZR XP



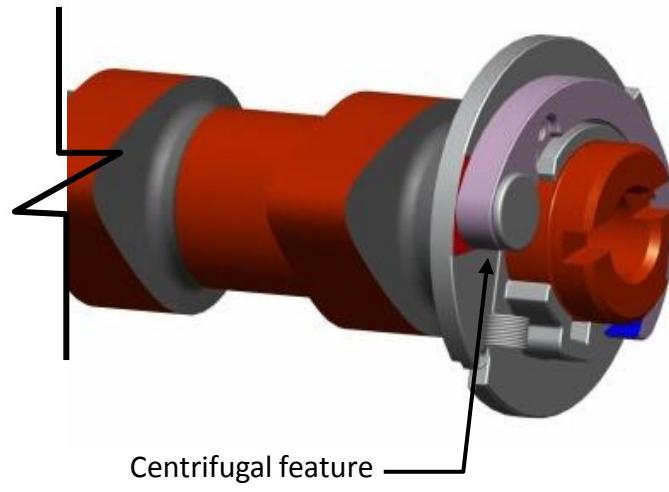
RZR 570

- Top end
- Centrifugal design compression release

Exhaust camshaft



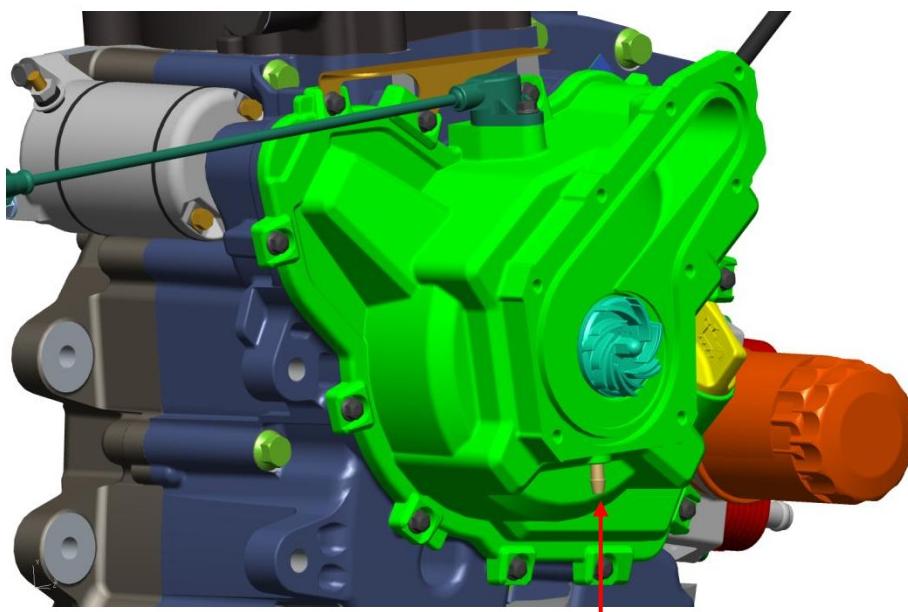
Compression release mechanism



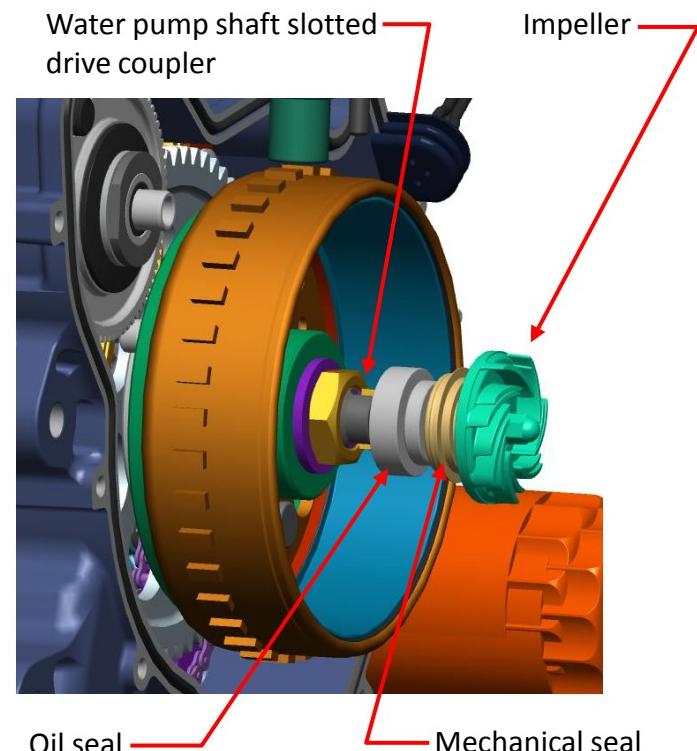
Centrifugal feature

RZR 570

- Water pump
- Impeller
- Shaft and seal



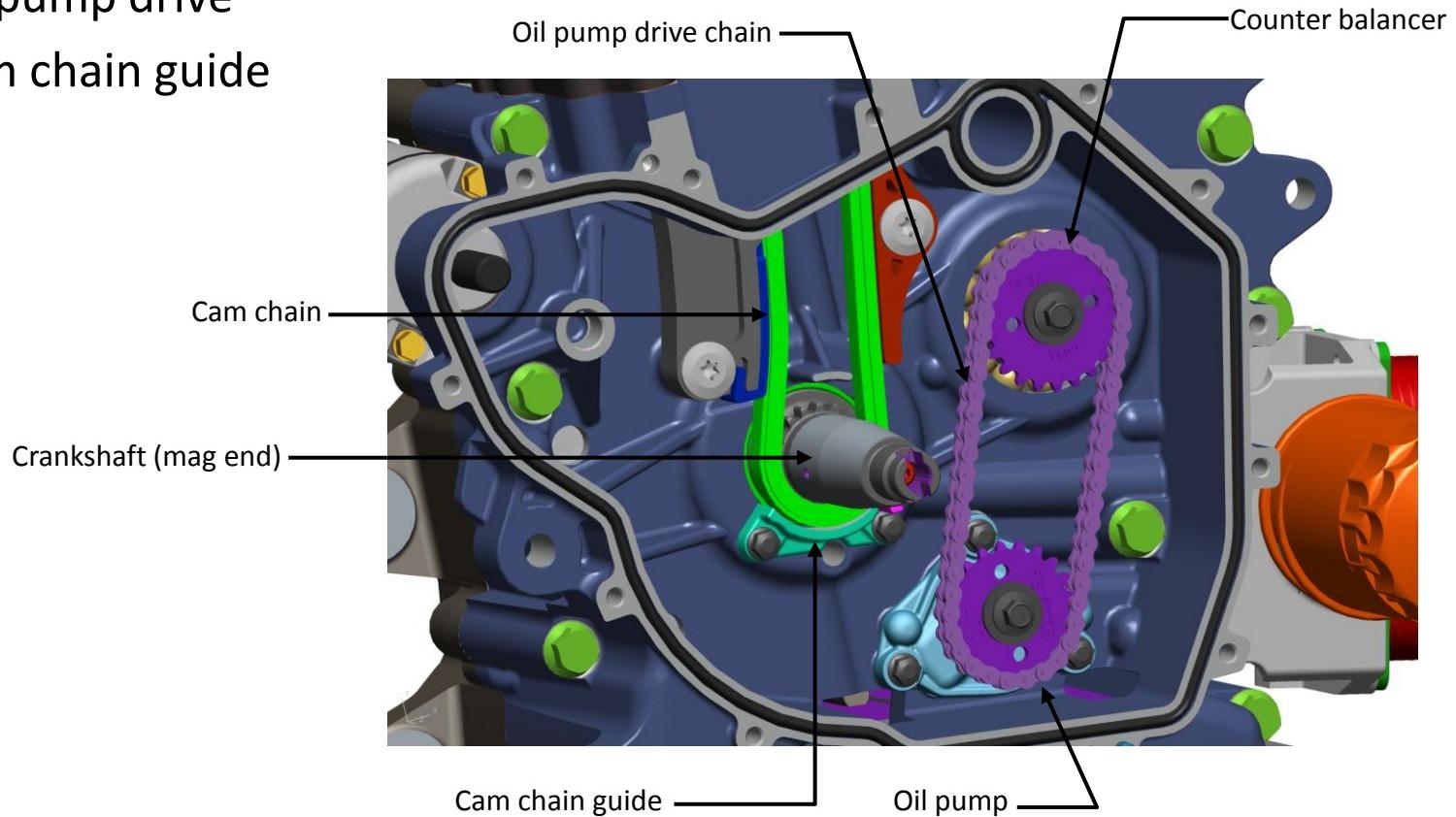
Mag cover houses the impeller, water pump shaft, oil seal, mechanical seal, and stator



NOTE: Mag cover removed for illustration

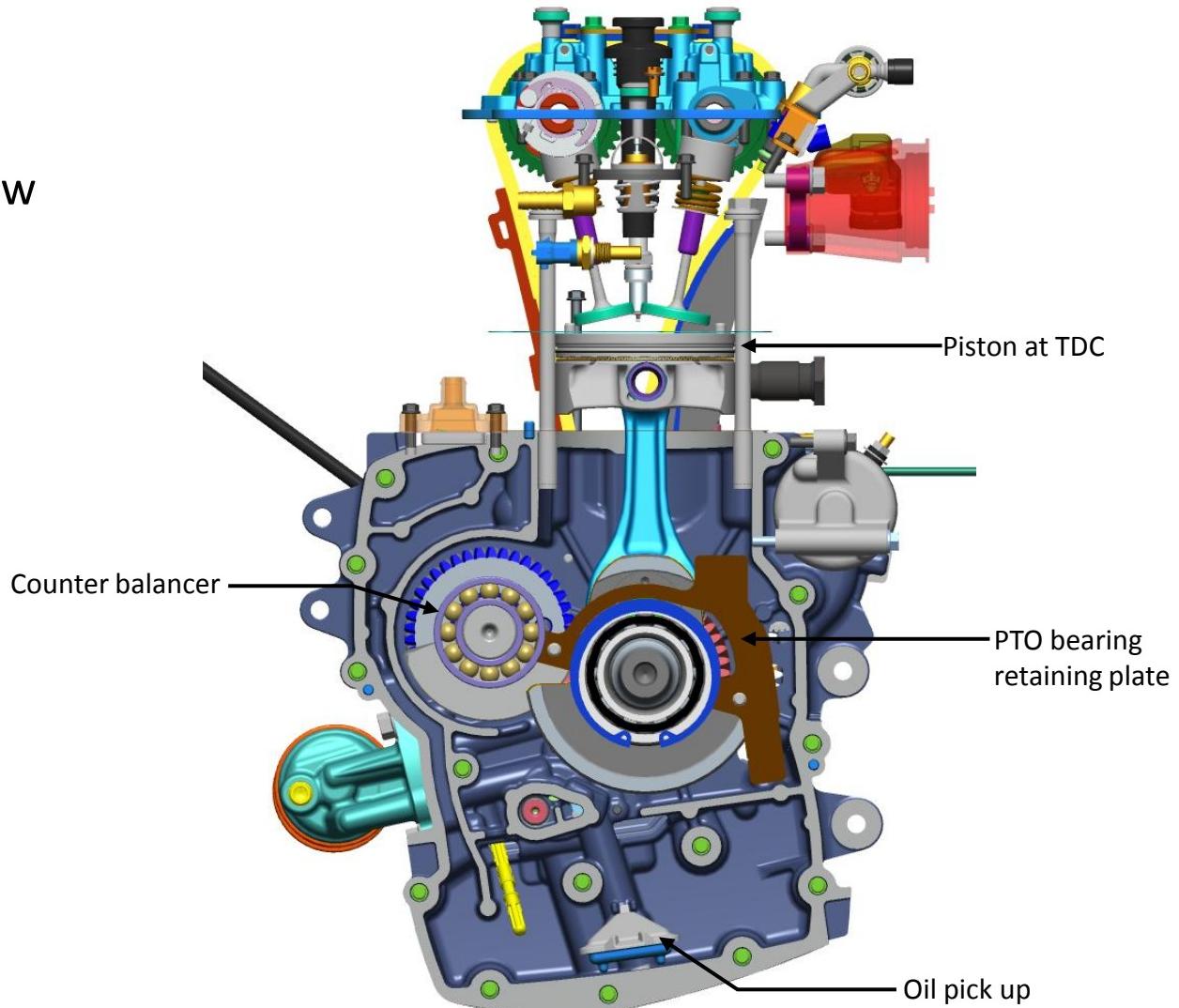
RZR 570

- Oil pump drive
- Cam chain guide



RZR 570

- Engine PTO view

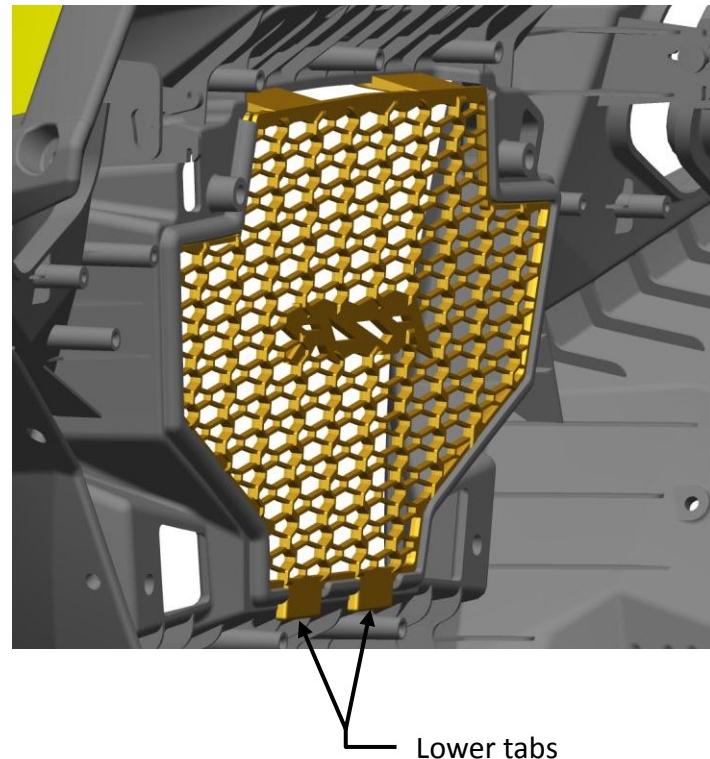
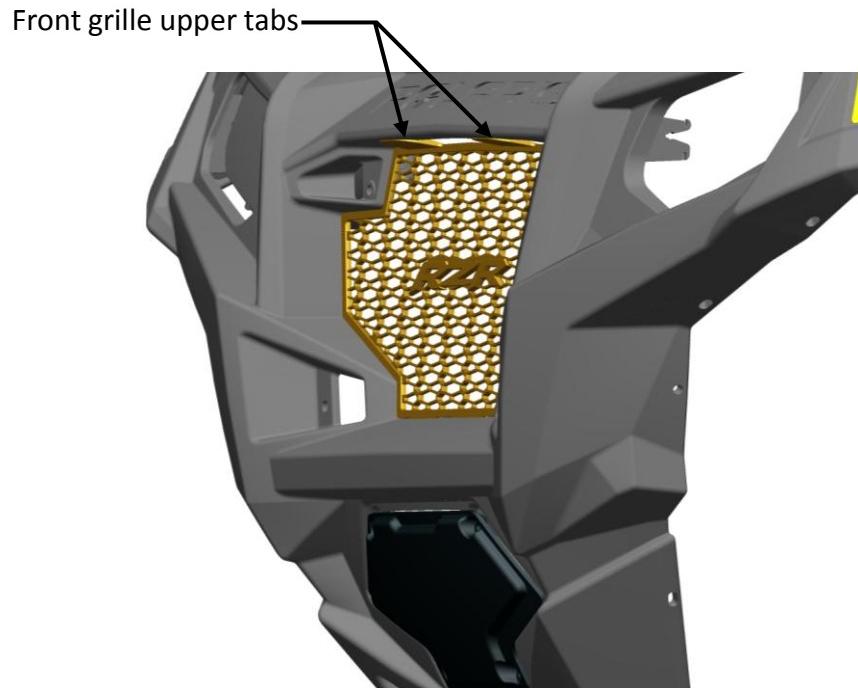


RZR 570

- Engine Management System
 - Based on 2011 RZR 800
 - M 17 controller
- Ignition Switch
 - 4 position
 - On - Start – Lights – Off
- Headlight circuit
 - Relay controlled
- Start circuit
 - Start solenoid grounds through brake light switch

All RZRs

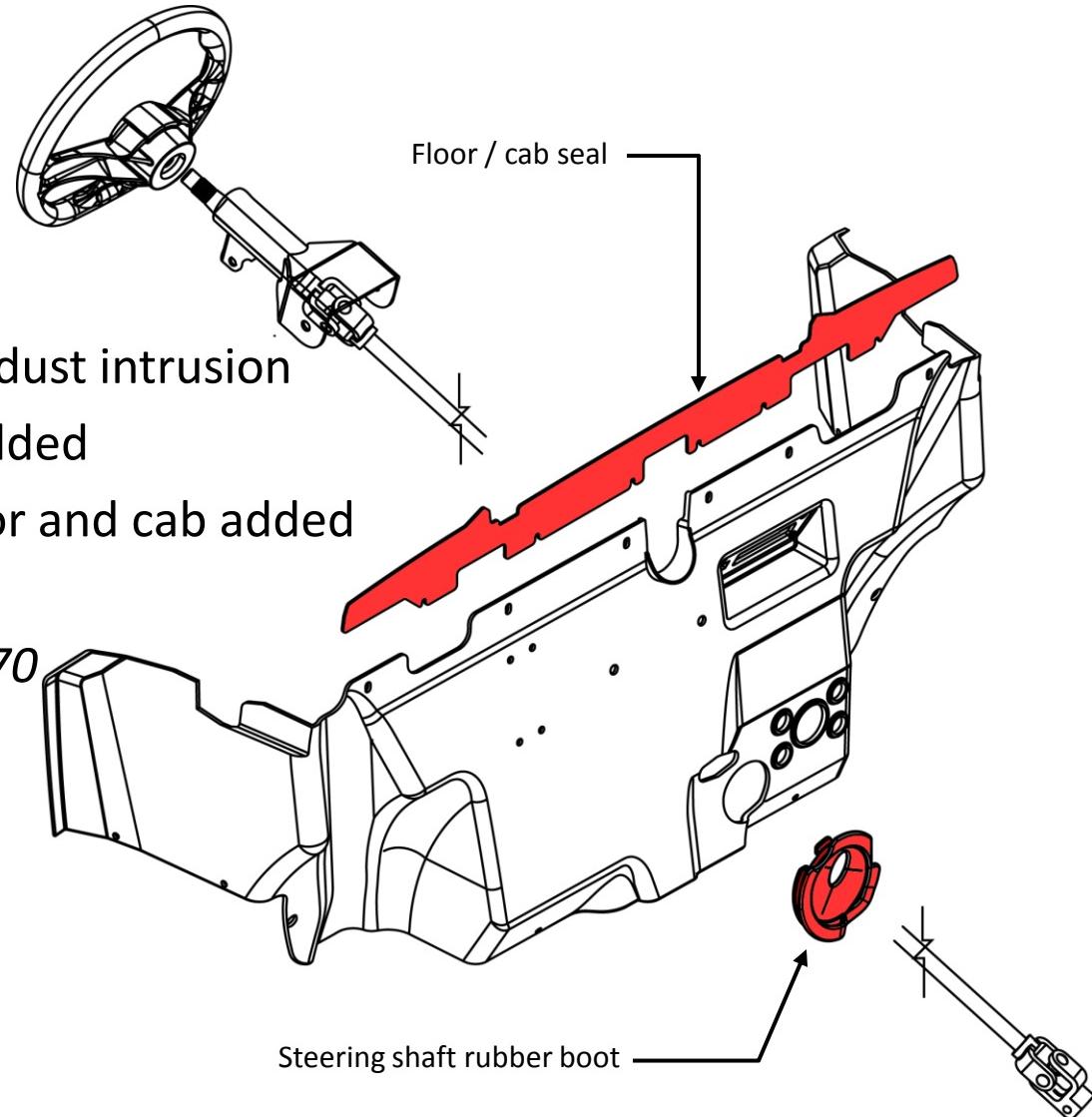
- Removable front grille
 - Easy radiator access
 - Snaps into place



All RZRs*

- Reduced cab water and dust intrusion
- Steering column boot added
- Upper seal between floor and cab added
 - Similar to RZR XP

**Not on the RZR 570*

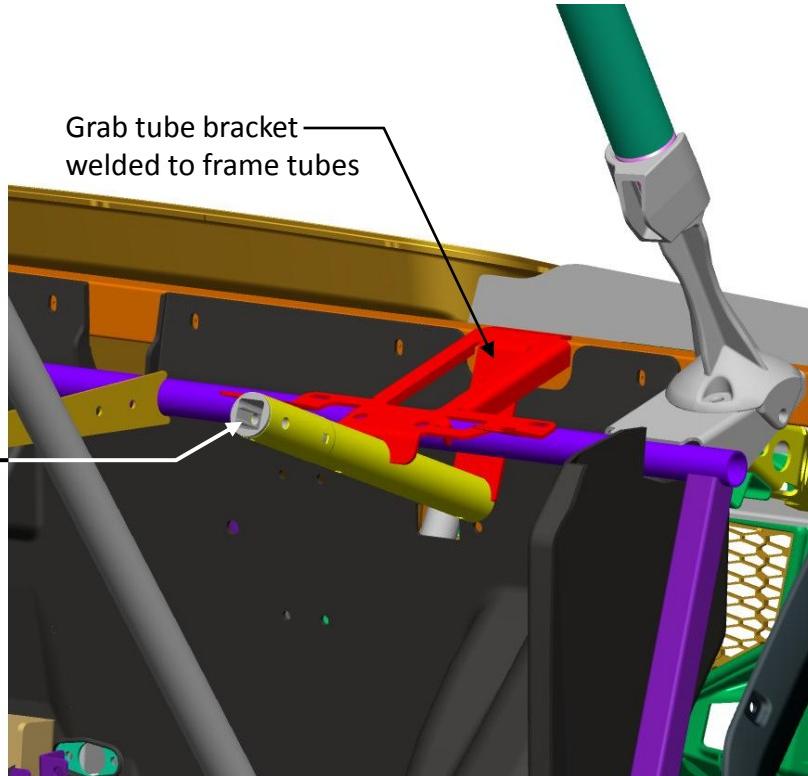
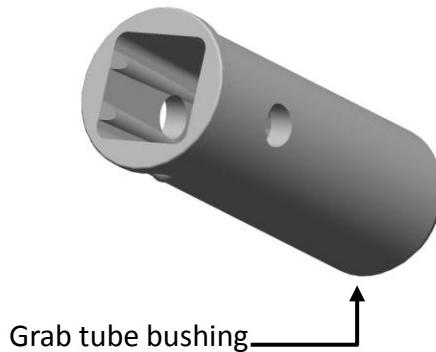


Improved dash sealing to keep mud and heat off the driver

All RZRs

- Revised passenger grab tube
 - Larger tube
 - Bushing added
 - Welded bracket

Will not retrofit back

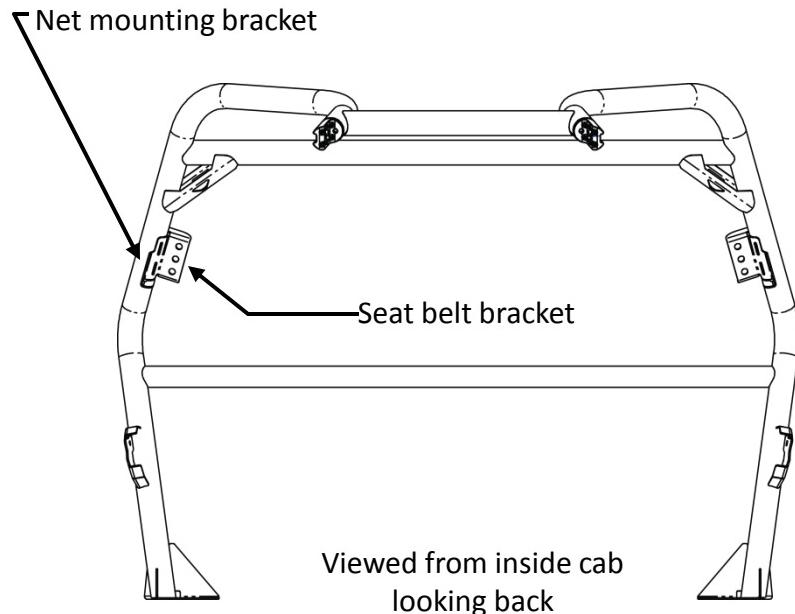


Anti-Rattle Passenger Grab Bar

NOTE: Plastic removed for visual purpose

RZR Seat Belt

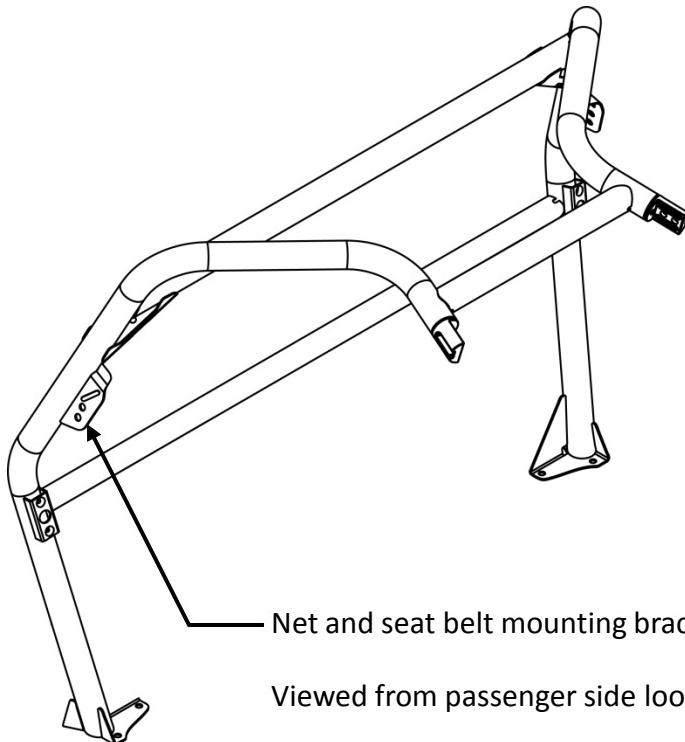
- Model year 2011 RZR cab frame
- Seat belt mounting location



Passenger side seat belt
Viewed from inside cab looking back

RZR Seat Belt

- Model year 2012 RZR cab frame
- Seat belt mounting location
- Common seat belt with RANGER

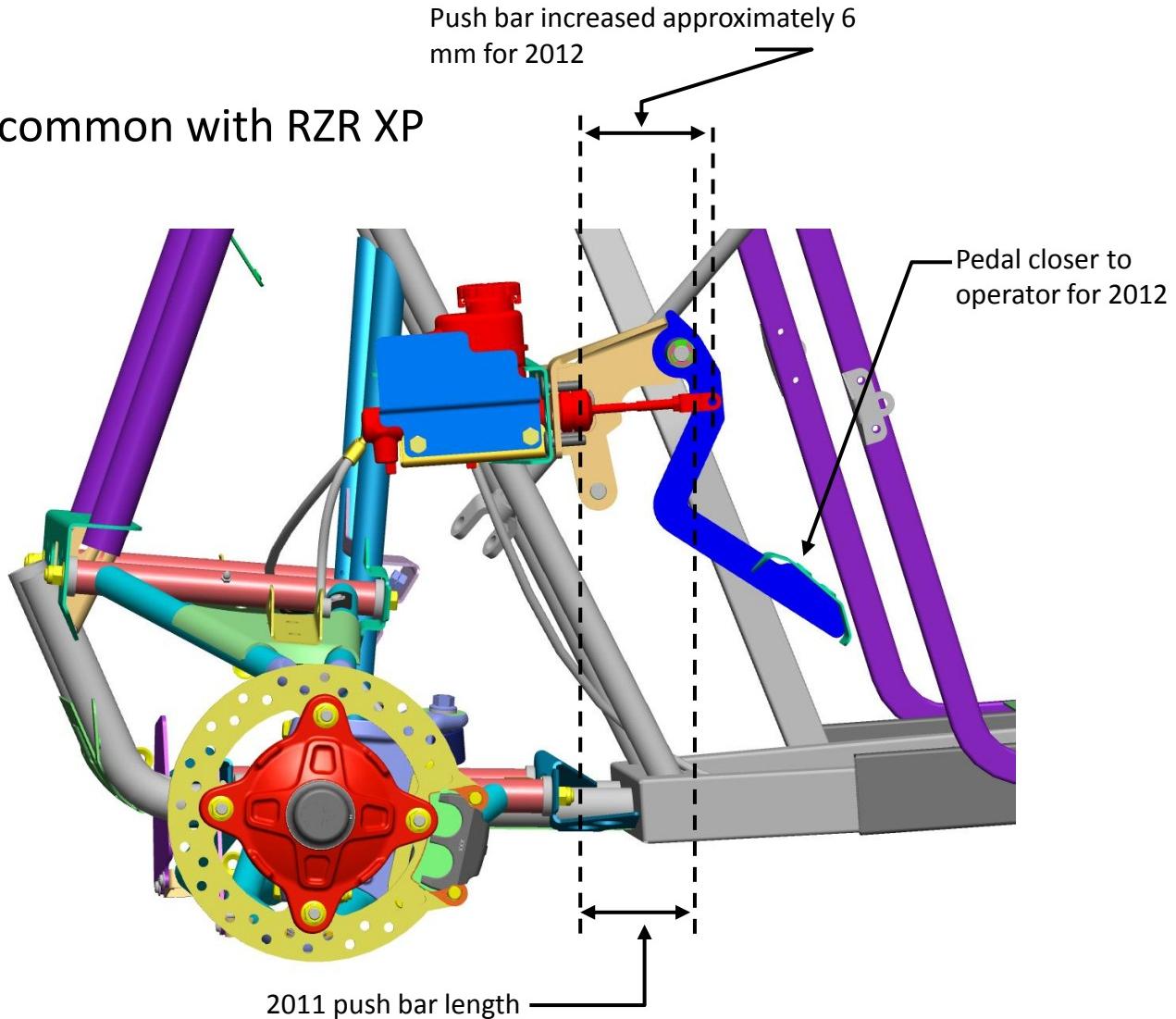


Passenger side seat belt
Viewed from passenger side looking into cab

RZR

- Master cylinder common with RZR XP

- RZR
- RZR S
- RZR4



RZR Shocks

- Shocks
 - RZR 50" twin tube
 - Revised jounce bumper
 - More durable material
 - RZR S Base model
 - Sachs mono tube
 - RZR S LE models
 - Fox Podium X
 - RZR 4 and RZR XP
 - Podium X 2.0
 - Clicker knobs
 - Revised calibration

Twin Tube

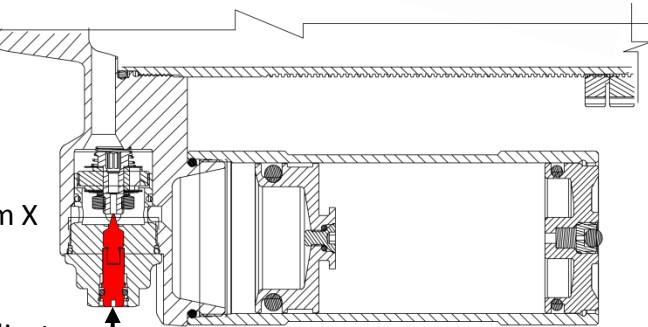


Mono tube



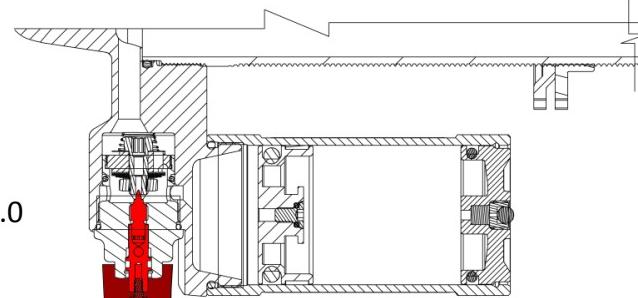
Podium X

Screw adjust



Podium X 2.0

Clicker knob

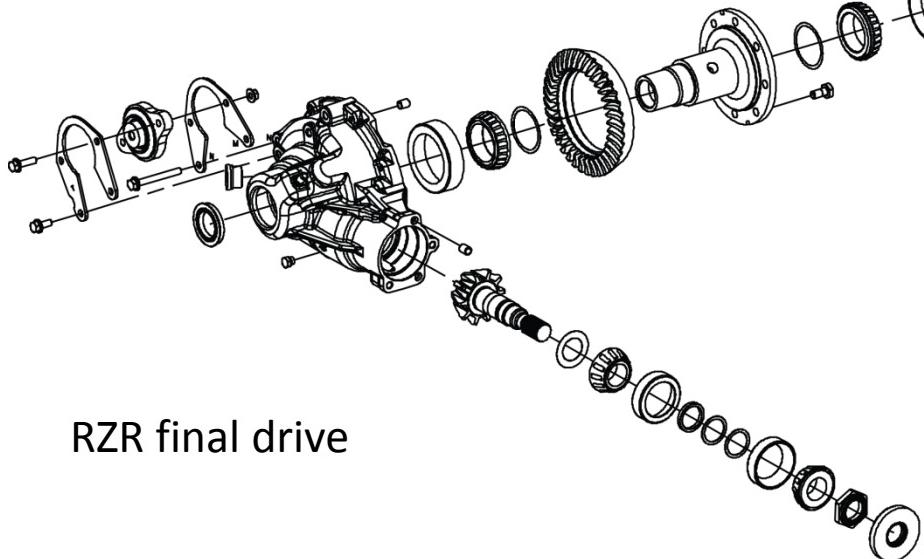


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All RZR with 800 engine

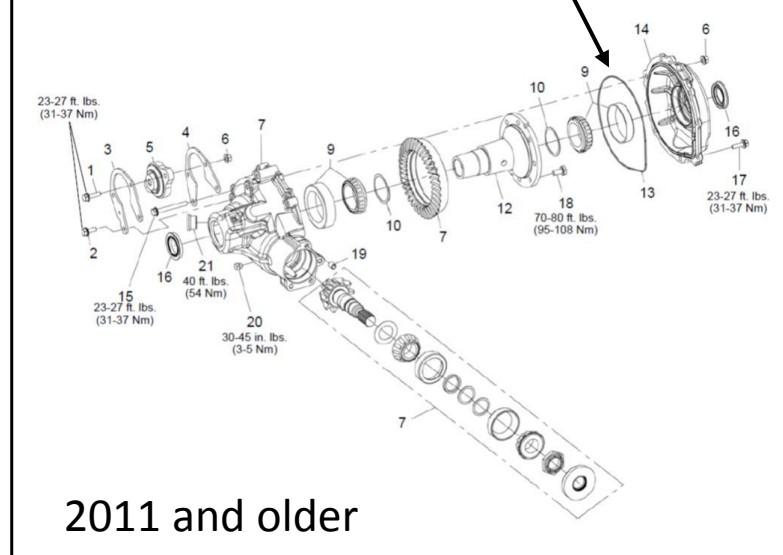
- Removed O-ring seal

Oil ring removed



RZR final drive

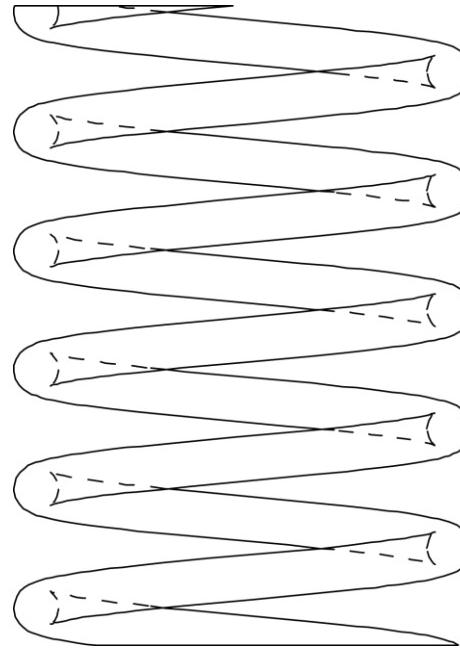
Oil ring seal



2011 and older

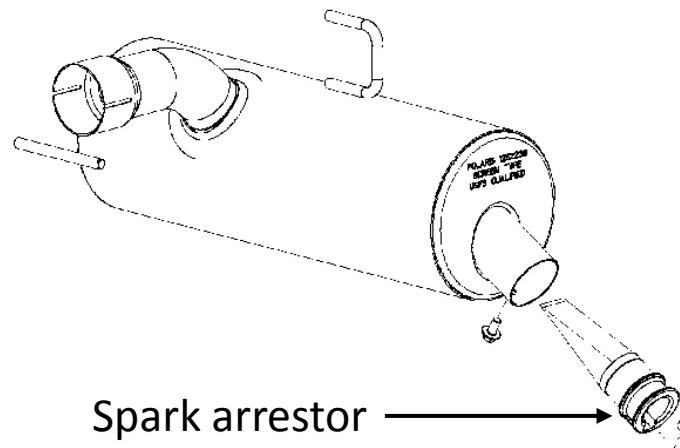
All RZR 800

- Revised drive clutch spring
- Increased pressure
- 7043789 Neon Green
- Will retrofit to 2011 RZR 800



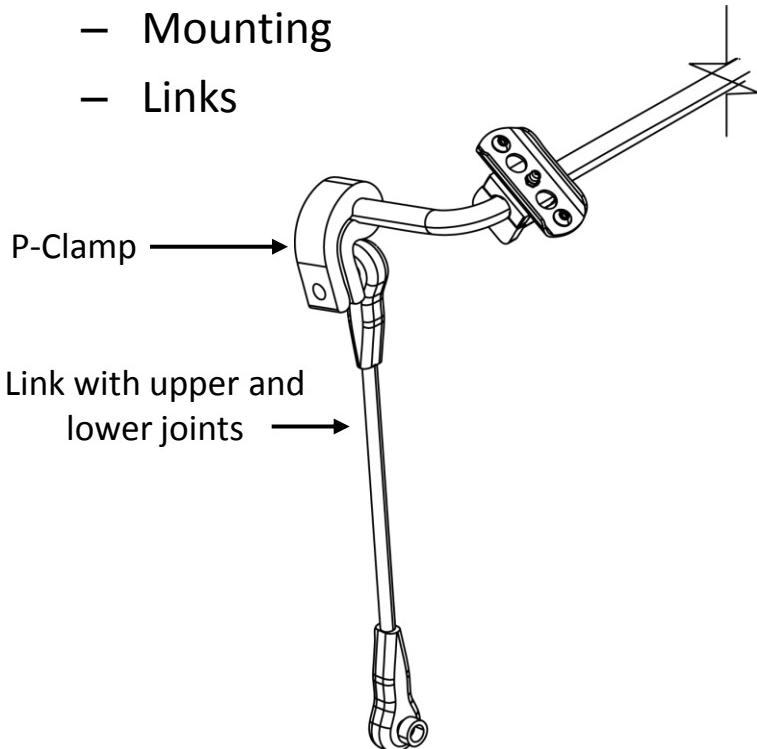
RZR 50" (127cm)

- Spark arrestor
 - Through-bolt design (similar to the RZR XP)

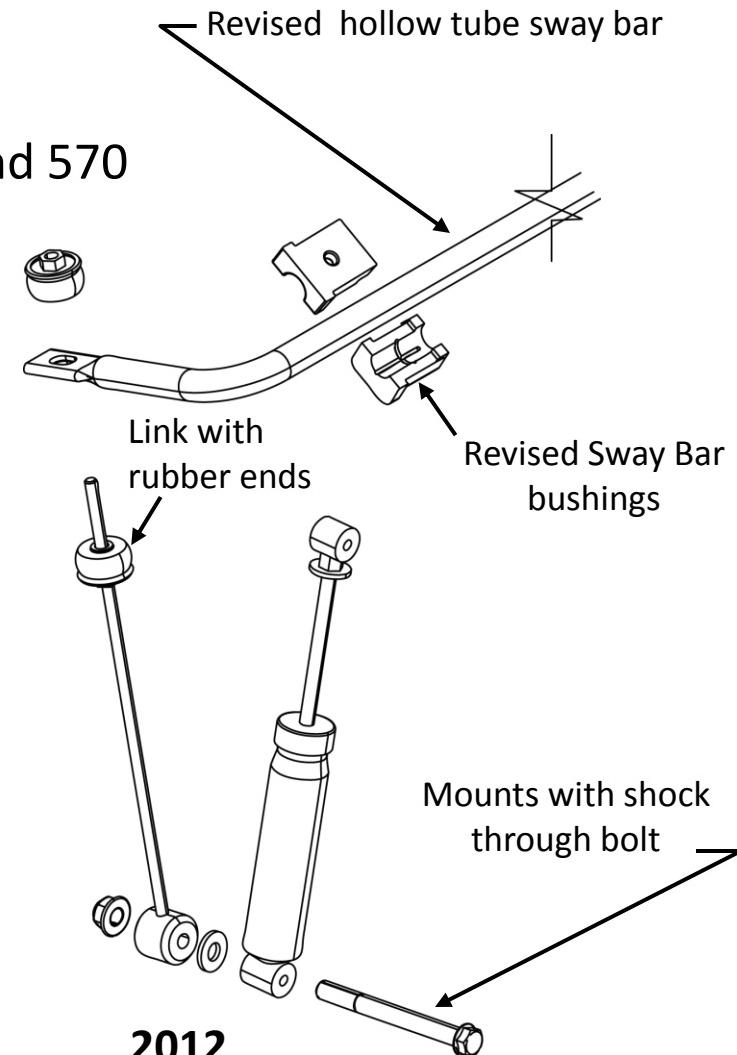


RZR 50" (127 cm) Sway Bar

- Revised front sway bar 50" (127 cm 800) and 570
 - Tube
 - Mounting
 - Links



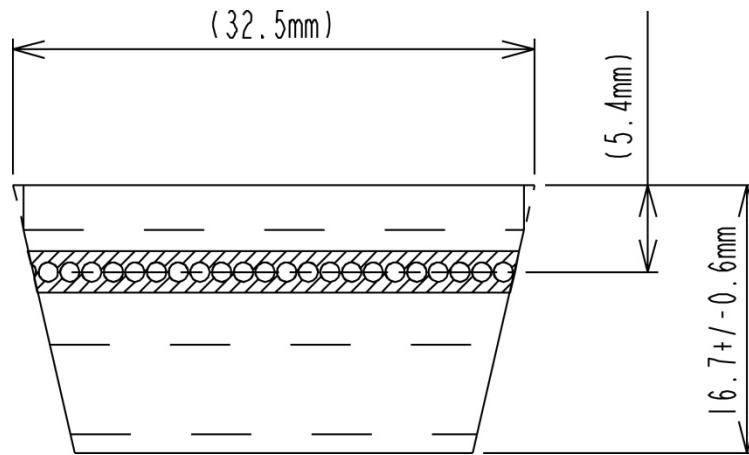
2011 and older



RZR General Clutch Changes

Revised RZR XP belt

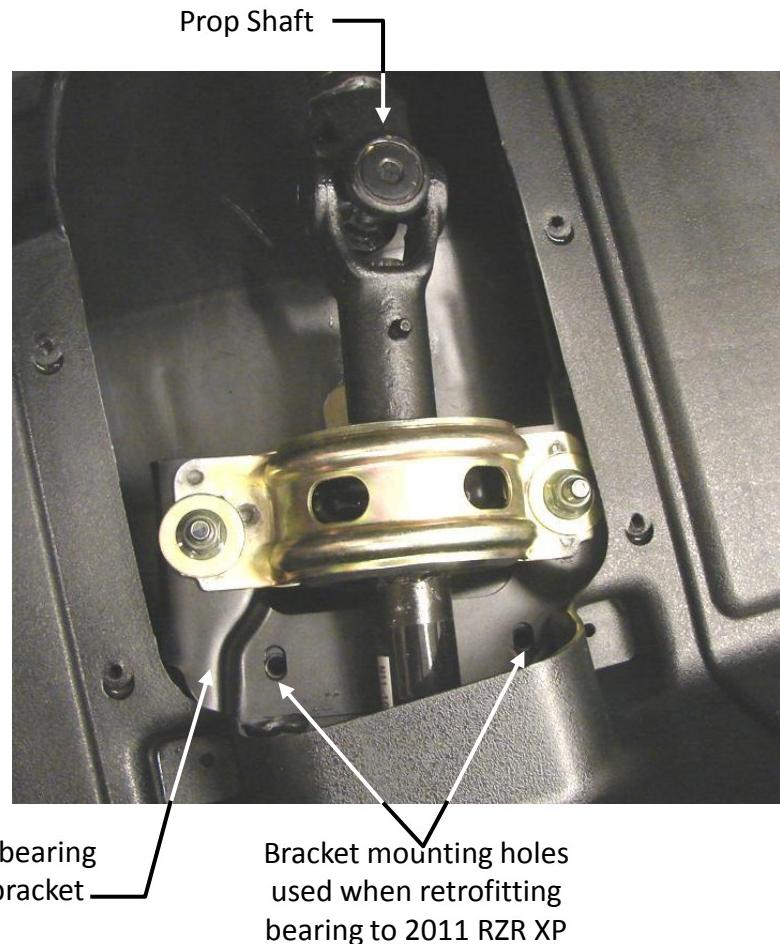
- Stronger
- Splice-less
- Cut edge
- 3211148 MBL



RZR XP

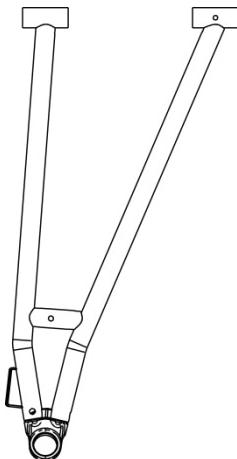
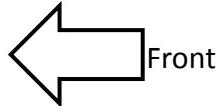
Revised prop shaft

- Rubber isolated bearing
- New bracket welded to frame
- Retrofit to 2011 RZR XP requires the following:
 - Both sections of shaft
 - Rubber mounted bearing
 - Shaft support bracket
 - Fasteners to secure the bracket to frame

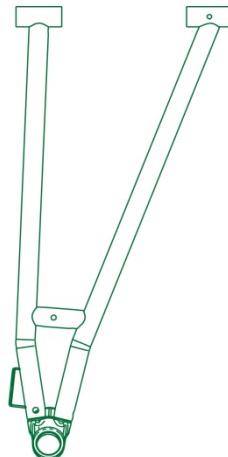


RZR XP

- Revised A-arm
- Caster change
- Reduces steering effort



Model year 2011

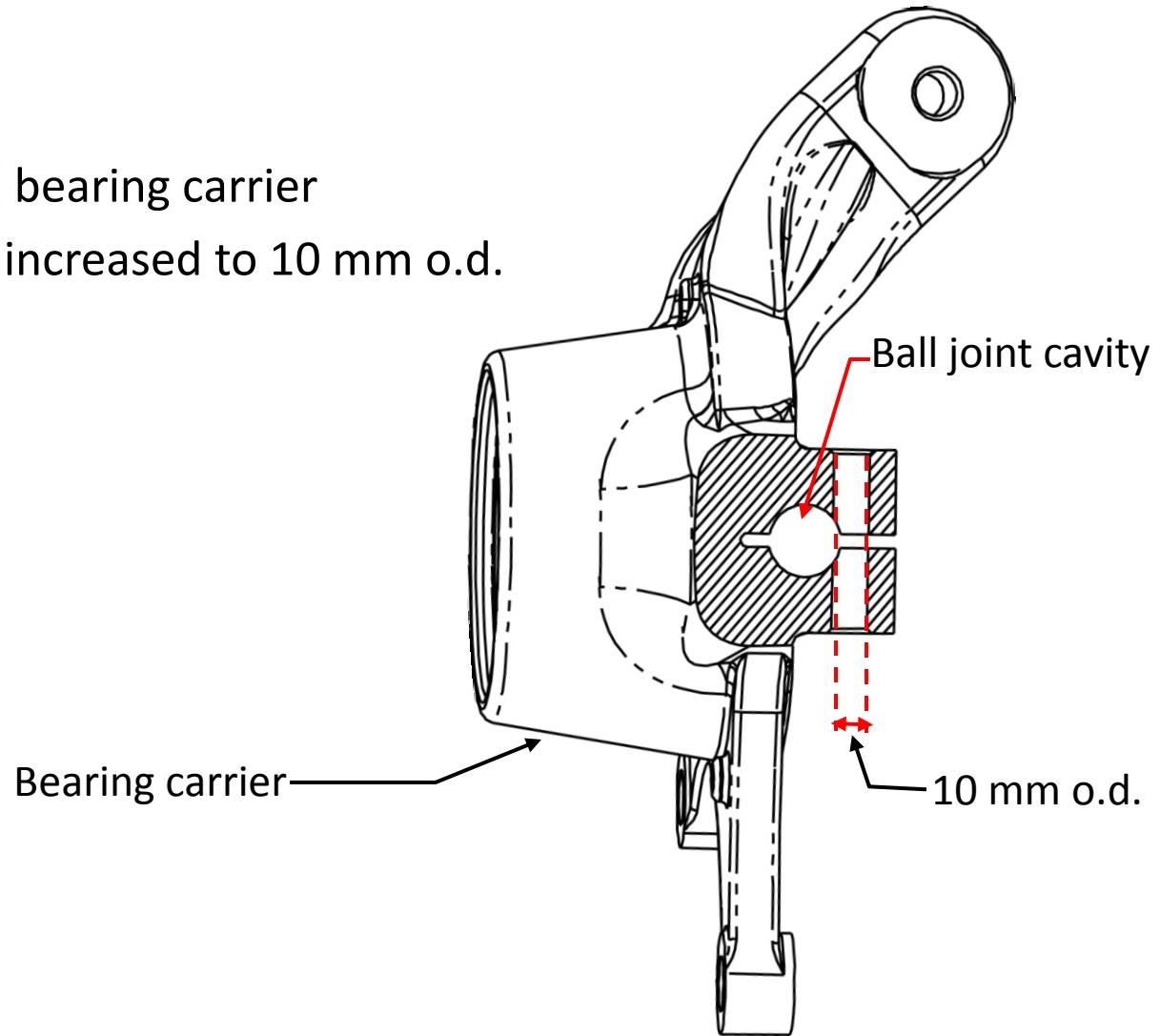


Model year 2012



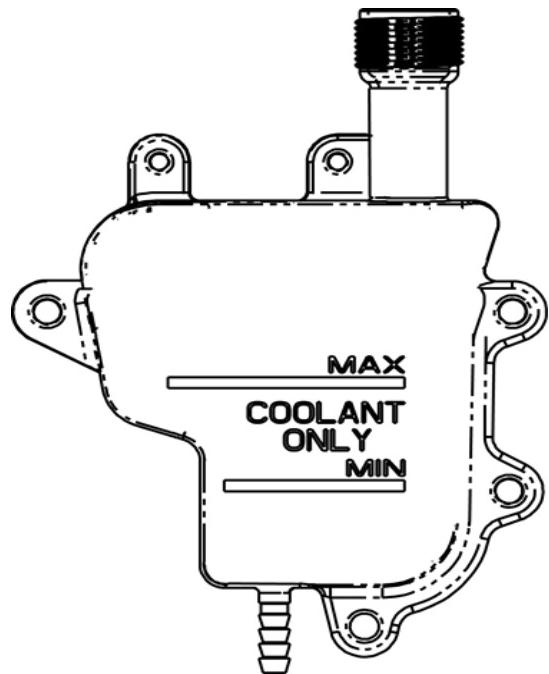
RZR XP

- Revised front wheel bearing carrier
- Ball joint pinch bolt increased to 10 mm o.d.

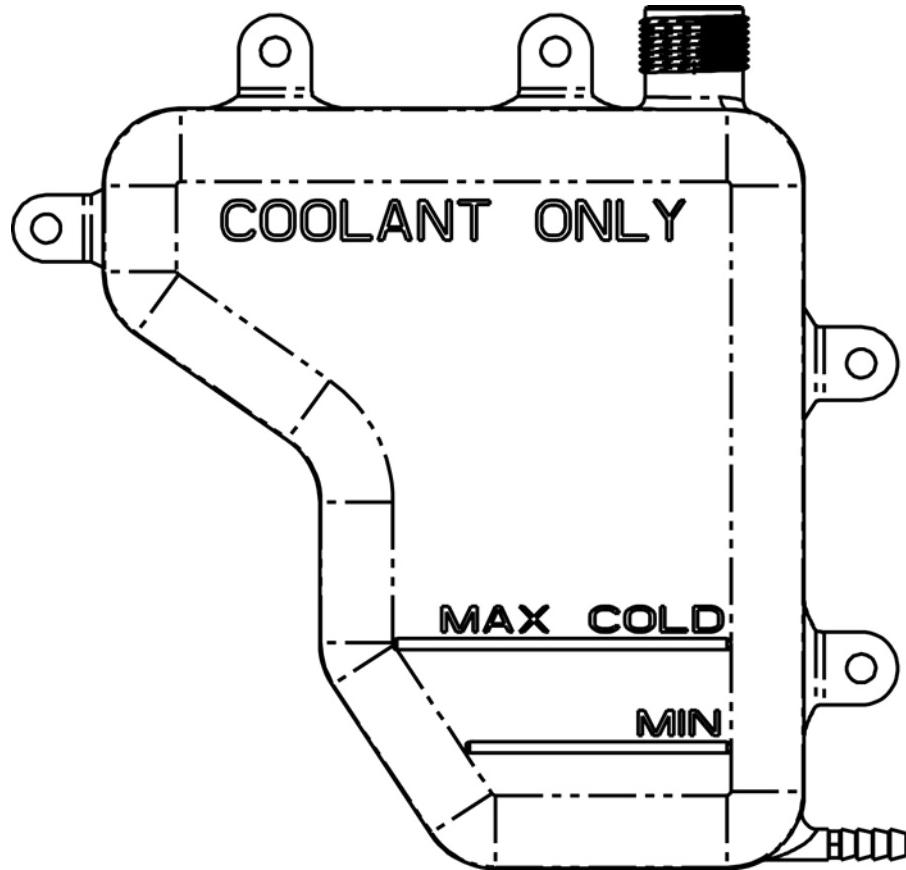


RZR XP

- Revised coolant surge tank
- Increased capacity



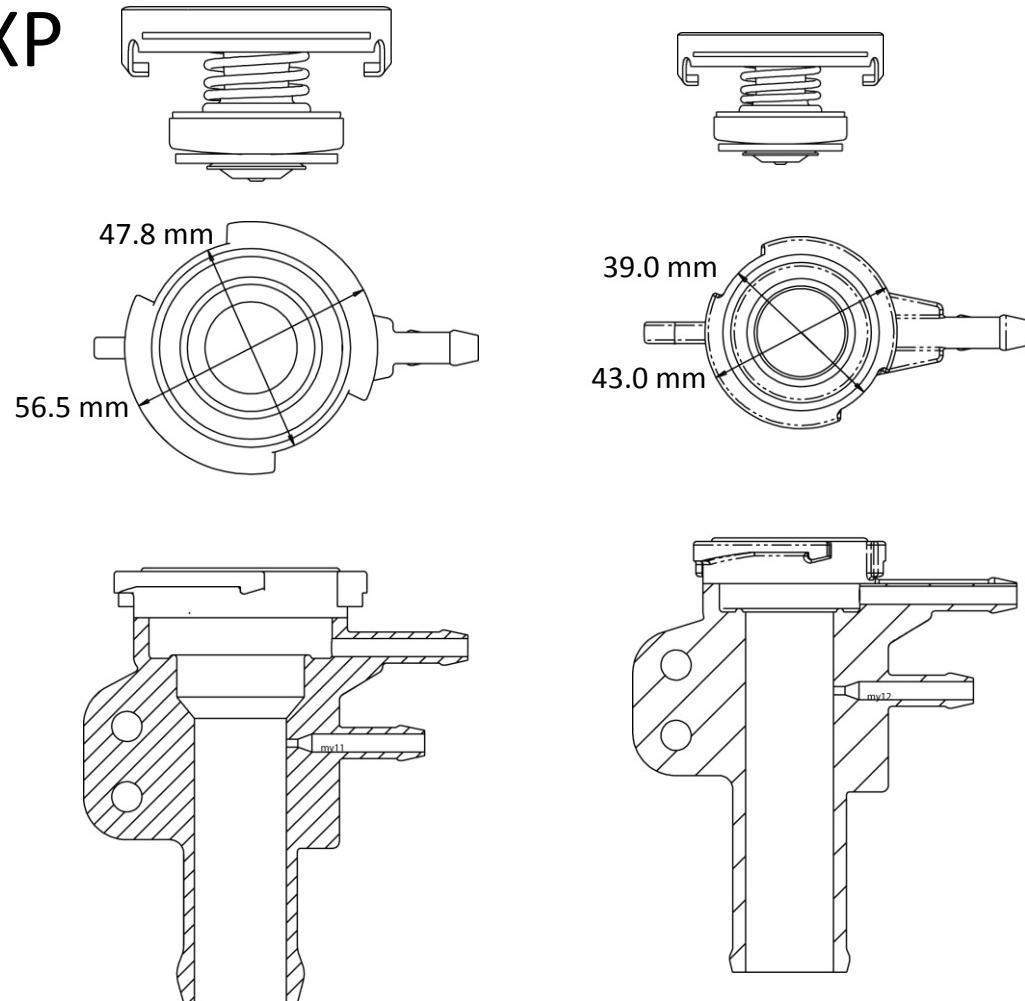
2011



2012

RZR 570 and RZR XP

- Cooling system
- Revised filler neck
- Revised radiator cap

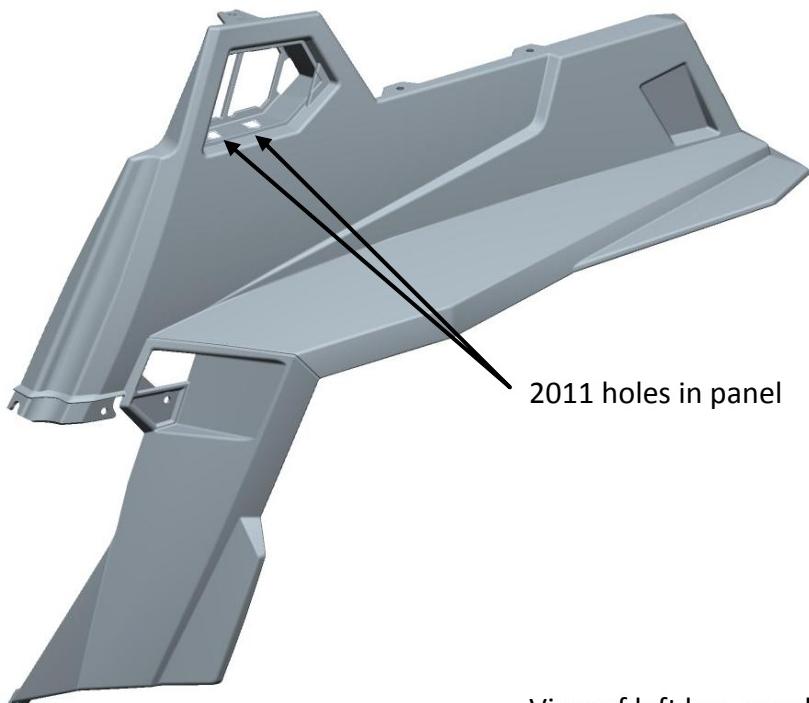


2011 RZR XP

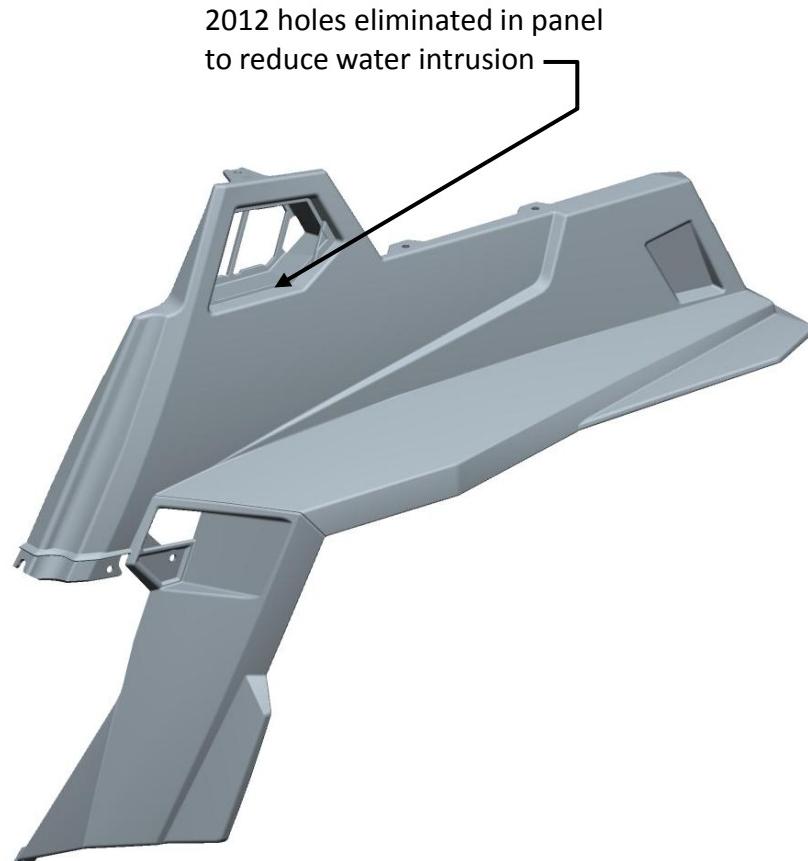
2012 RZR 570 and RZR XP

RZR XP

- Revised box panels
 - Reduced water intrusion
 - Behind the grille and the foam
 - Both PVT and engine air inlet

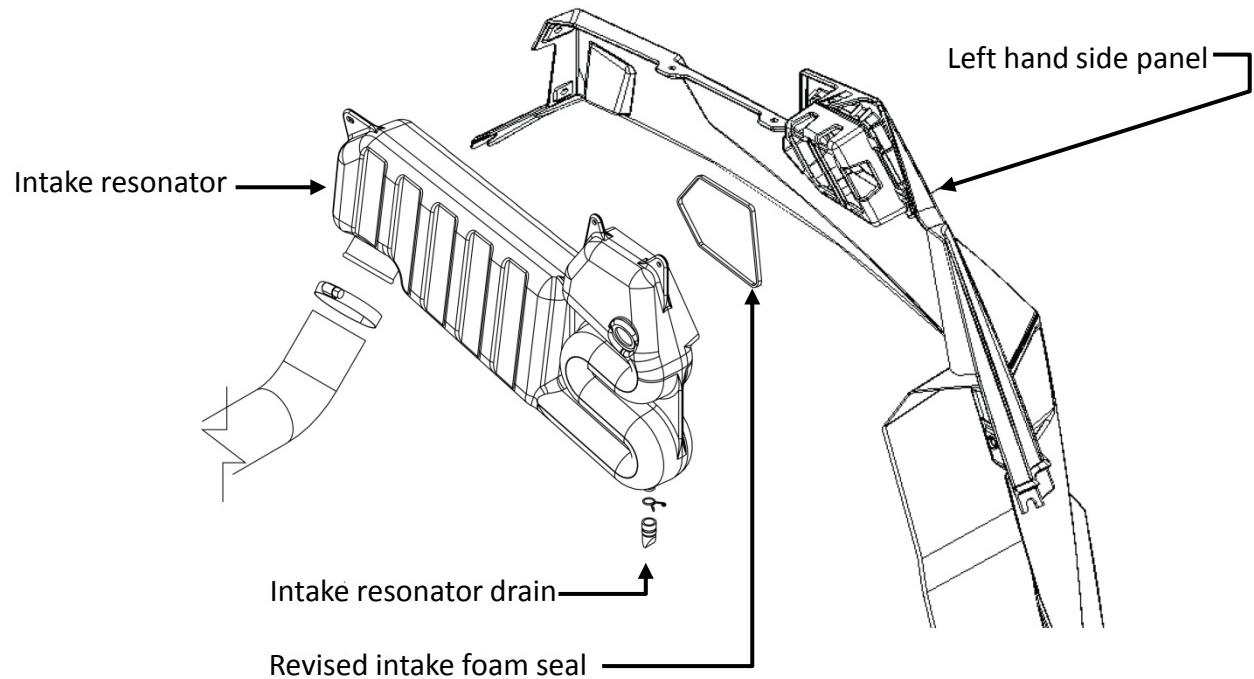


View of left box panel



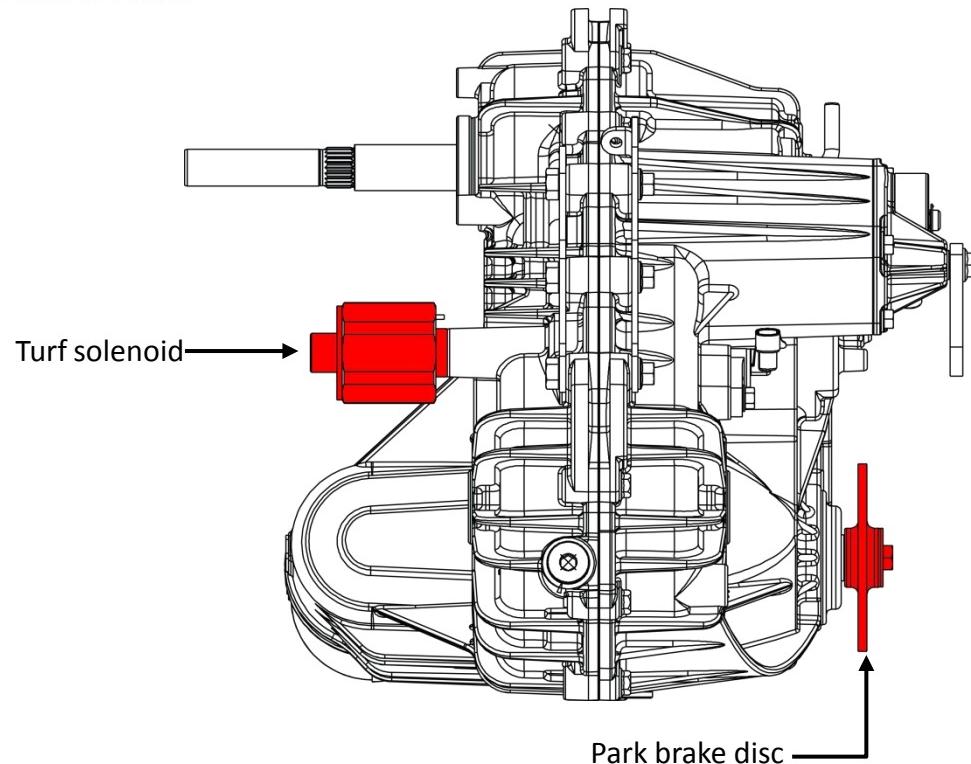
RZR XP

- Revised side panel intake foam seal
 - Reduces water intrusion



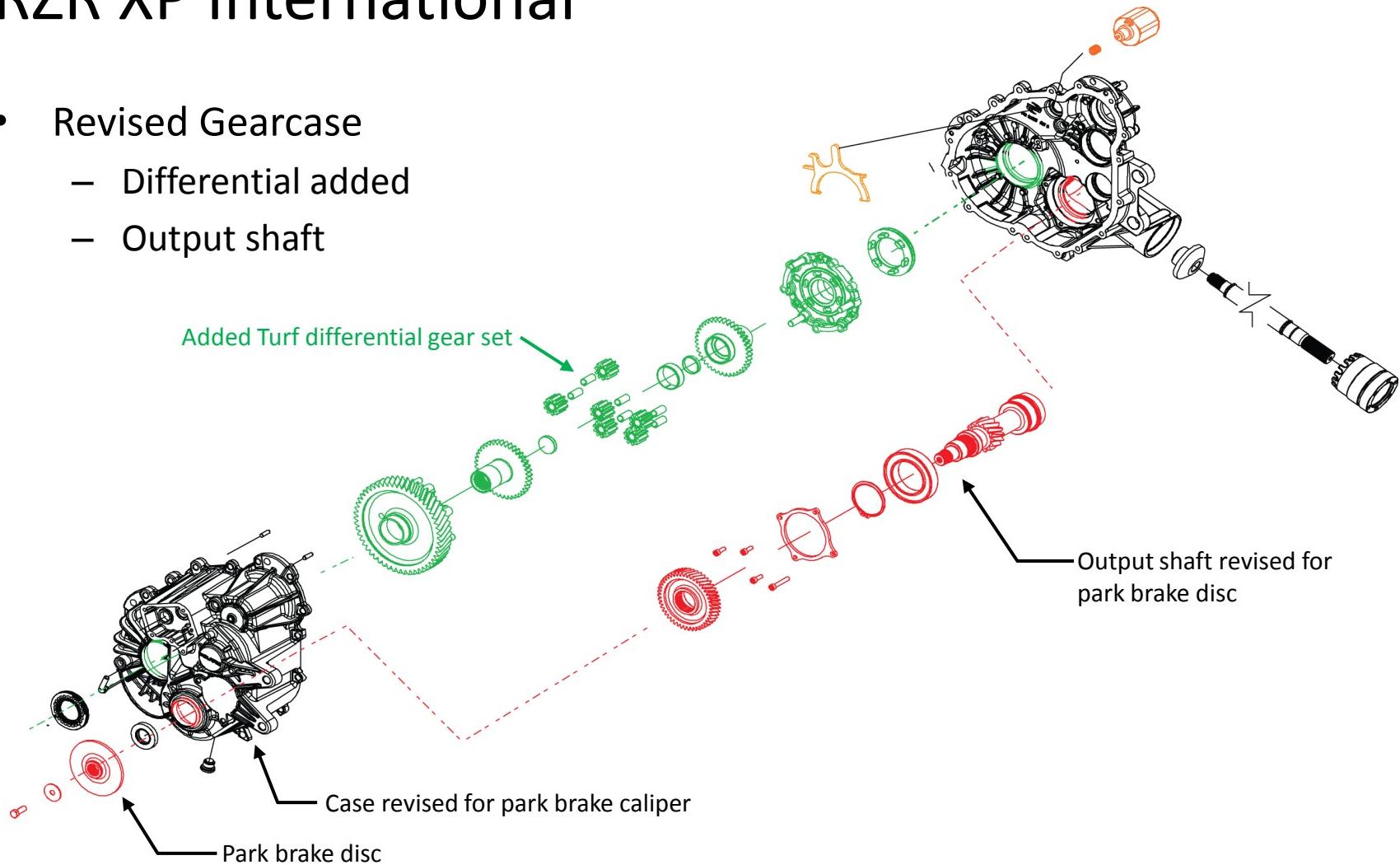
RZR XP International

- New features
 - External mechanical park brake
 - Turf mode
 - Differential



RZR XP International

- Revised Gearcase
 - Differential added
 - Output shaft



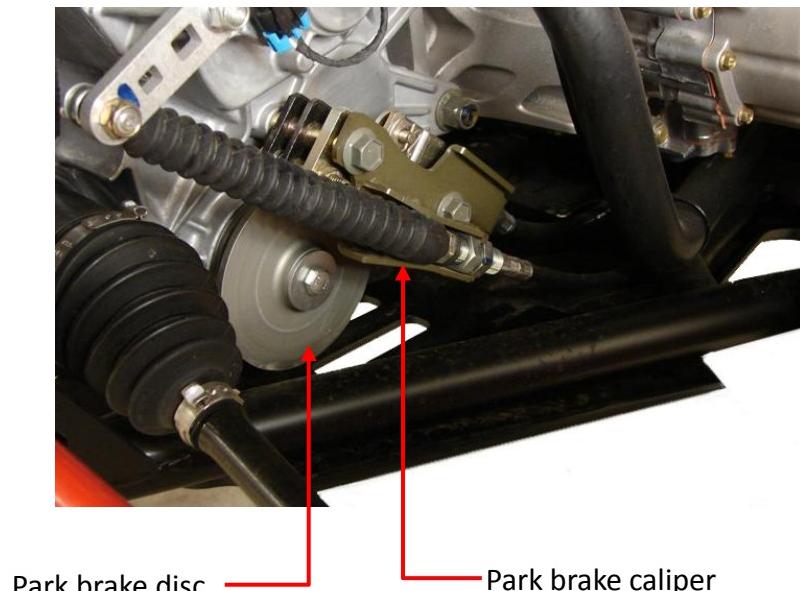
RZR XP International

- External mechanical park brake
 - Lever assembly
 - Caliper assembly



Park brake lever assembly mounted
between seat belt buckles

*NOTE: Rubber boot removed for
illustration*



ATV

- Discontinued models
 - Outlaw
 - 850 X2
- What changed?
 - All ADC models
 - Added O-rings to hub clutch packs
 - All Sportsman XP
 - Revised A-arm
 - Sportsman XP 550
 - Added Luk Coupler (similar to Sportsman 850)
 - Sportsman XP 850
 - Increased power
 - Revised connecting rods
 - Classic Sportsman
 - Revised front cab
 - International Classic Sportsman
 - New procedure for headlight adjustment

2012 Sportsman 850 XP



2012 Sportsman 550 XP

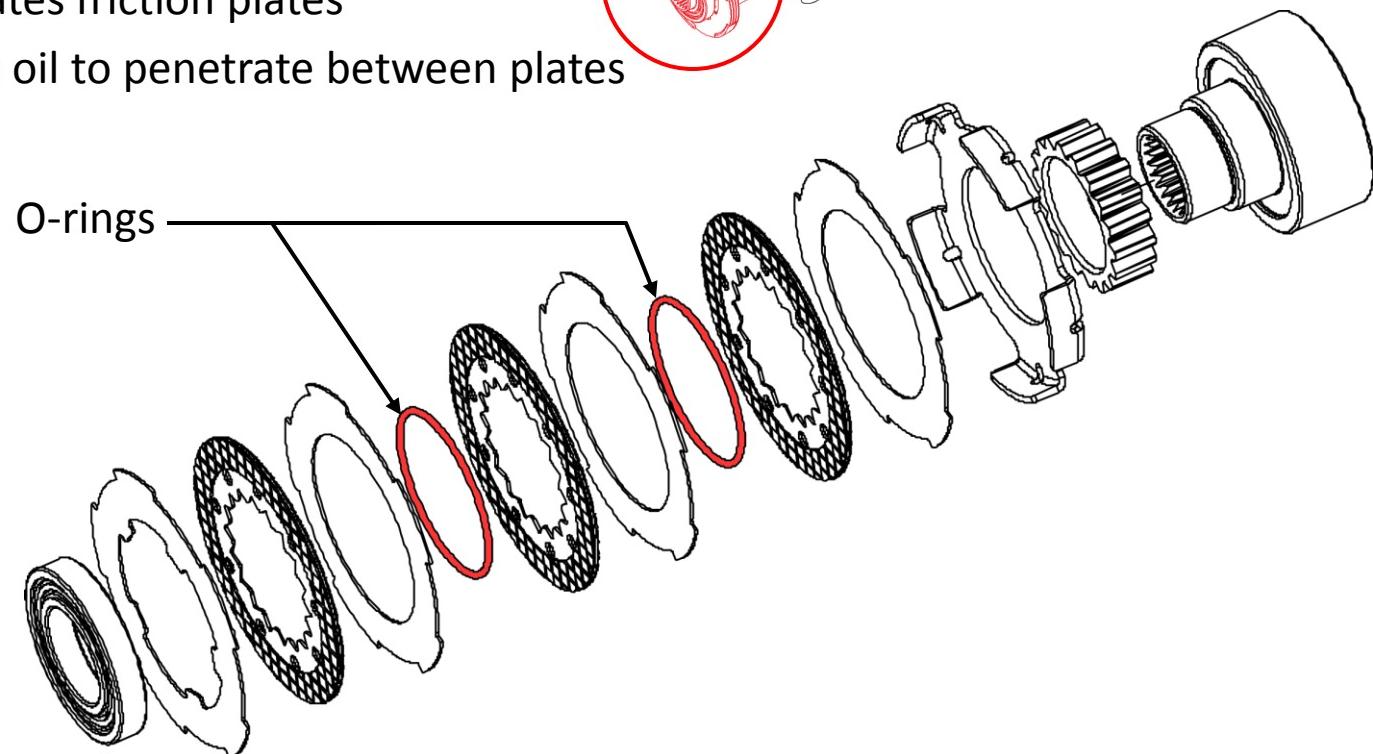
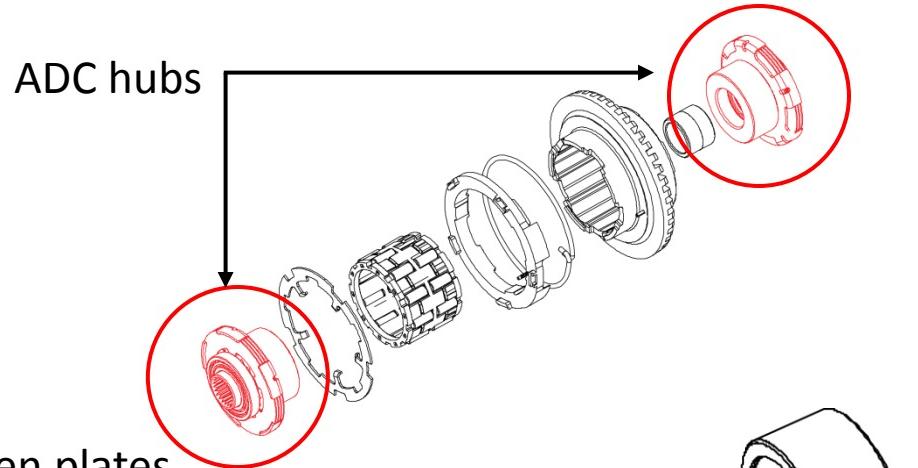


2012 Sportsman 500 HO



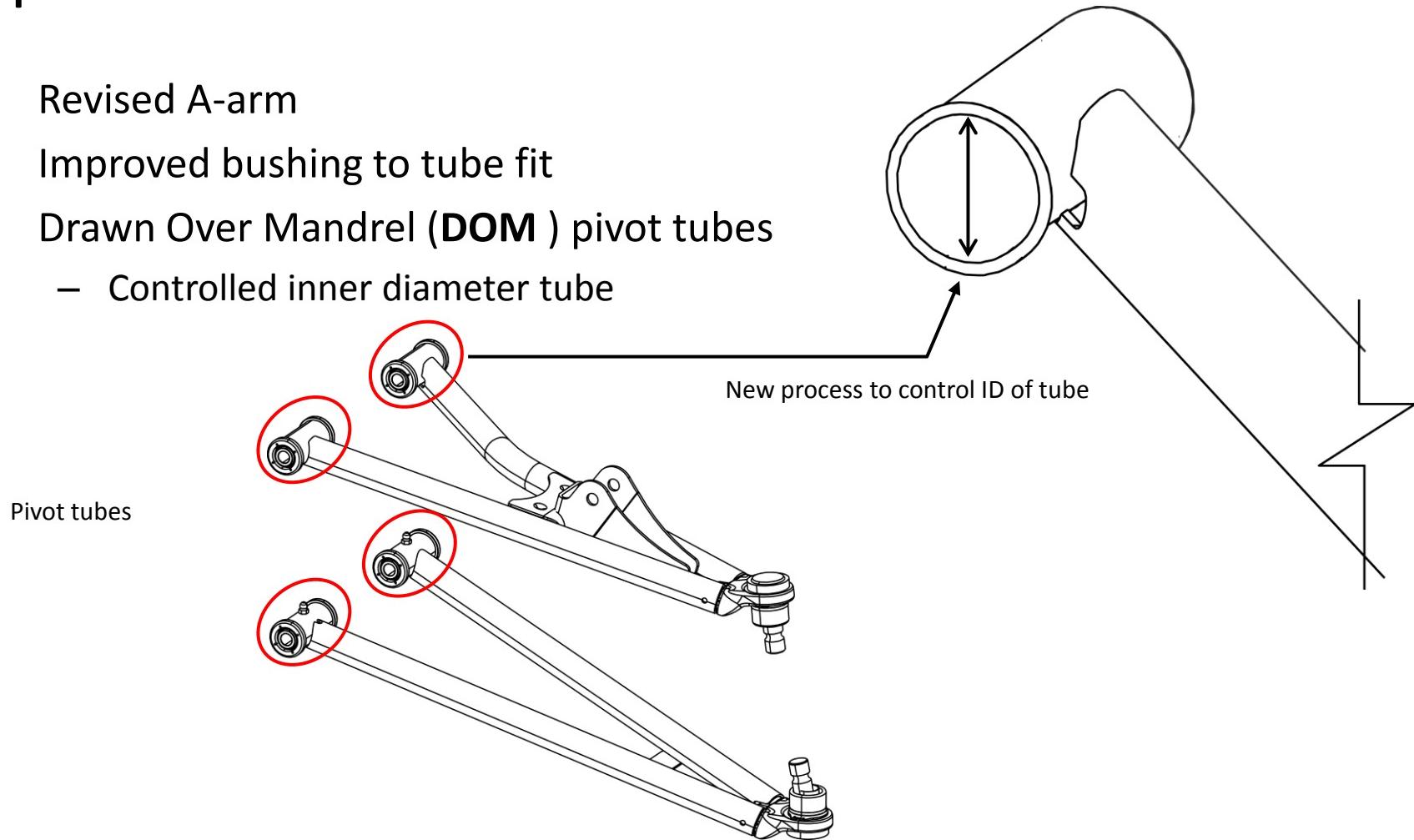
Sportsman ADC

- Revised ADC hub
 - O-rings added to hubs
 - Separates friction plates
 - Allows oil to penetrate between plates



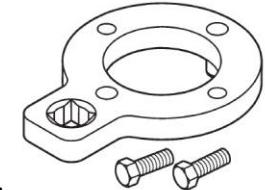
Sportsman XP

- Revised A-arm
- Improved bushing to tube fit
- Drawn Over Mandrel (**DOM**) pivot tubes
 - Controlled inner diameter tube



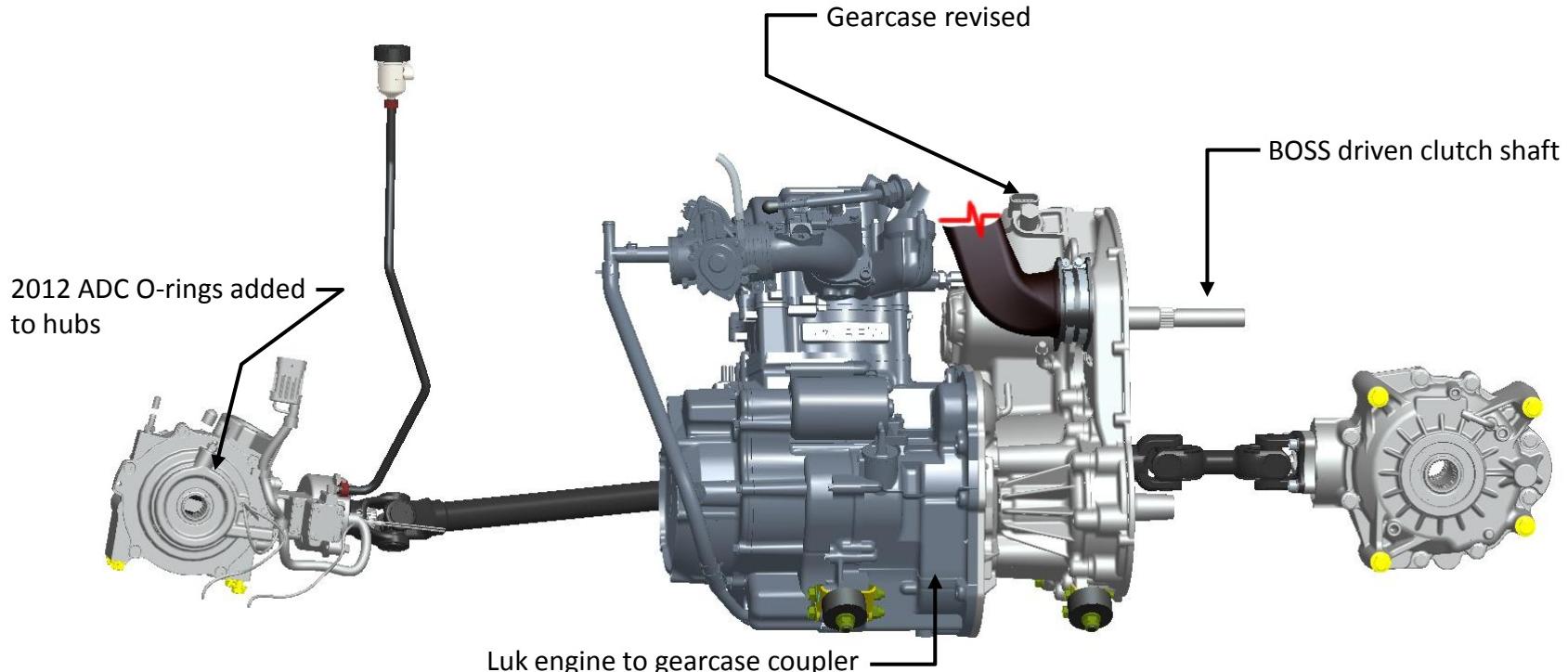
Sportsman 550

- 2011 Sportsman XP550 built after 03/01/11 and all 2012
 - Luk Coupler
 - Revised main gearcase
 - BOSS driven clutch



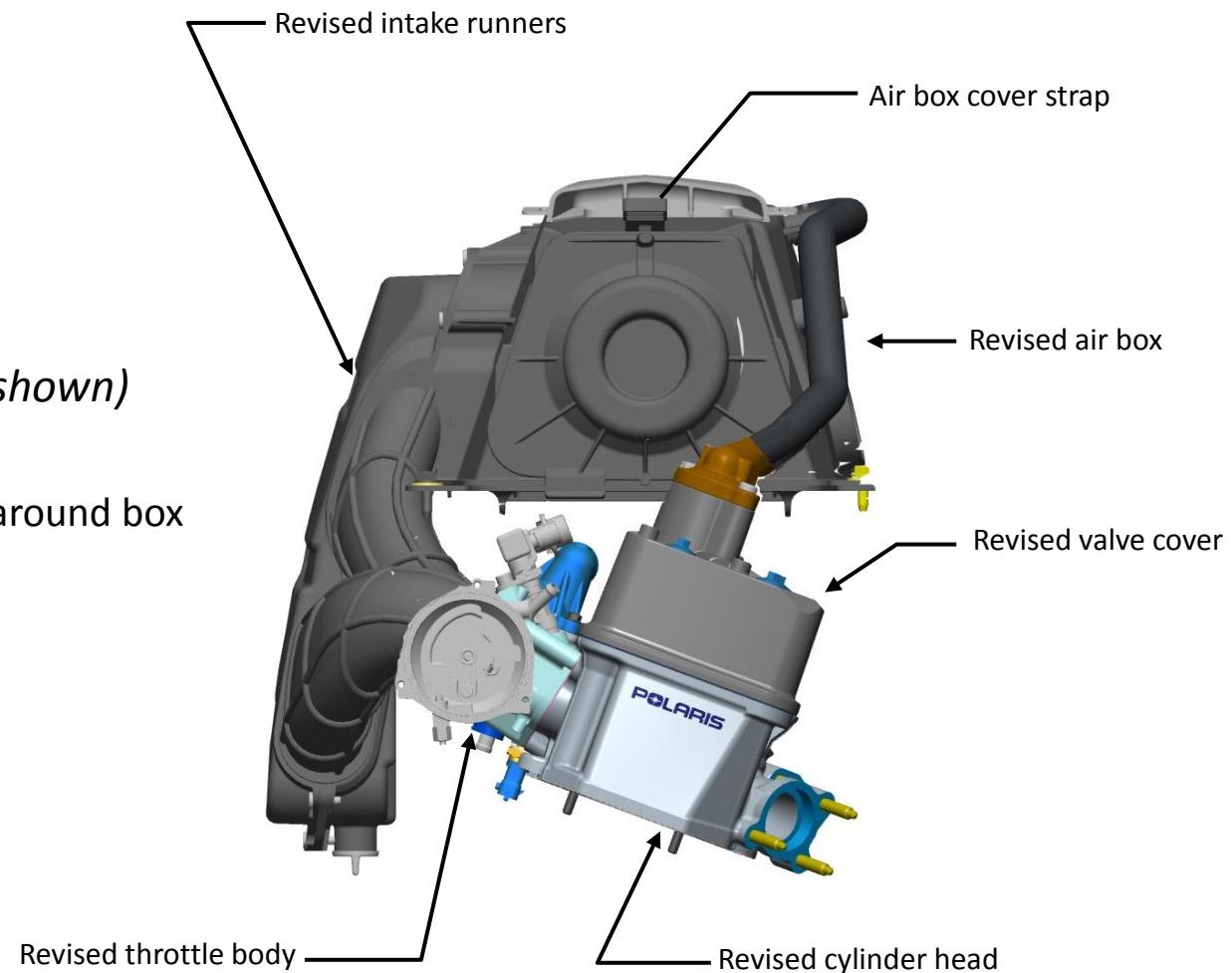
PA-50420
Crankshaft Coupler Holder

Application: Sportsman XP 550 units built after 03/01/11
 Used to hold the crankshaft when applying torque to the coupler nut.



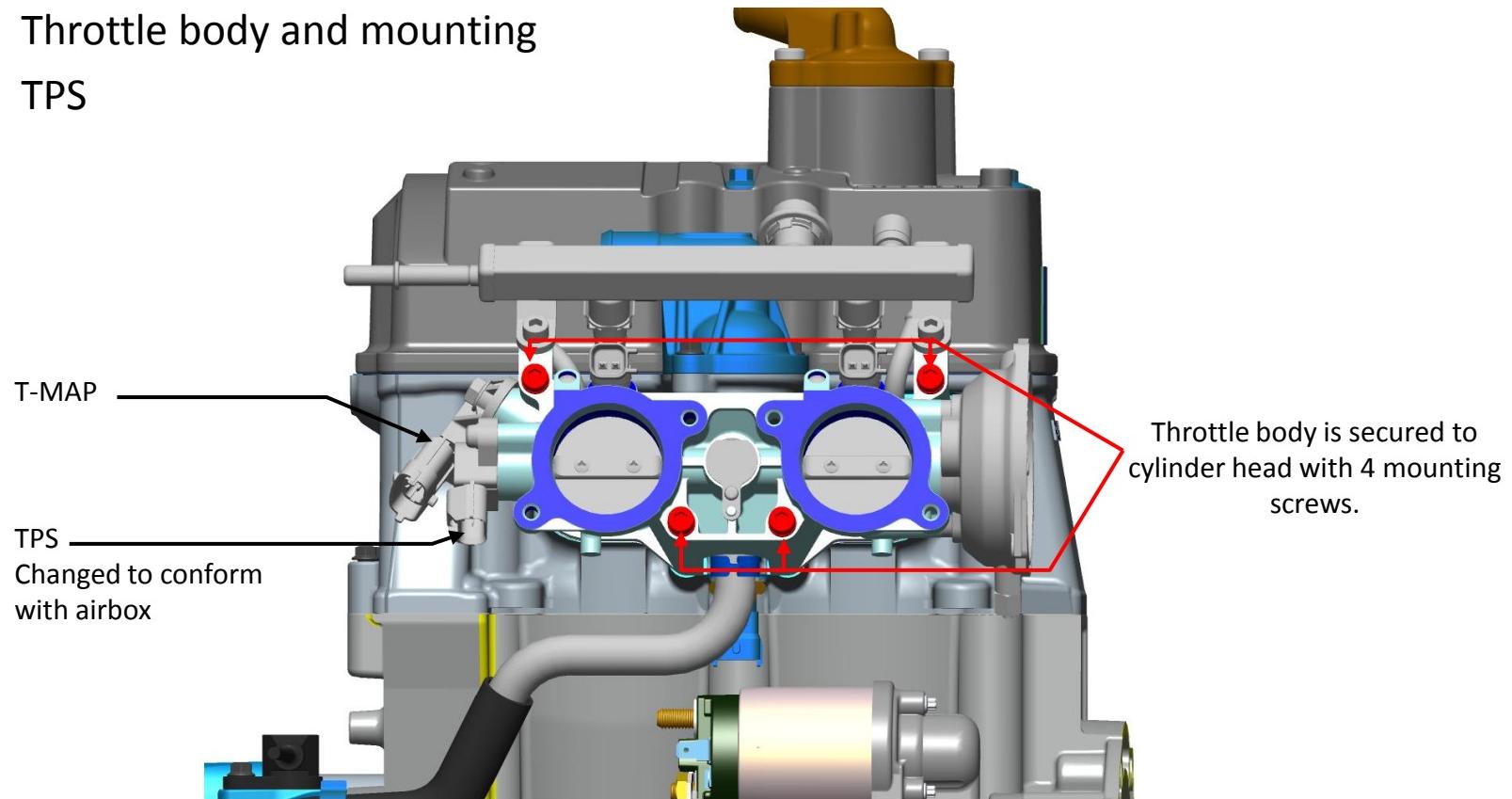
Sportsman 850 XP

- Revised
 - Intake system
 - Throttle body
 - Cylinder head
 - Side covers (*not shown*)
 - Larger air box
 - Revised to fit around box
- Increased power



Sportsman 850 XP

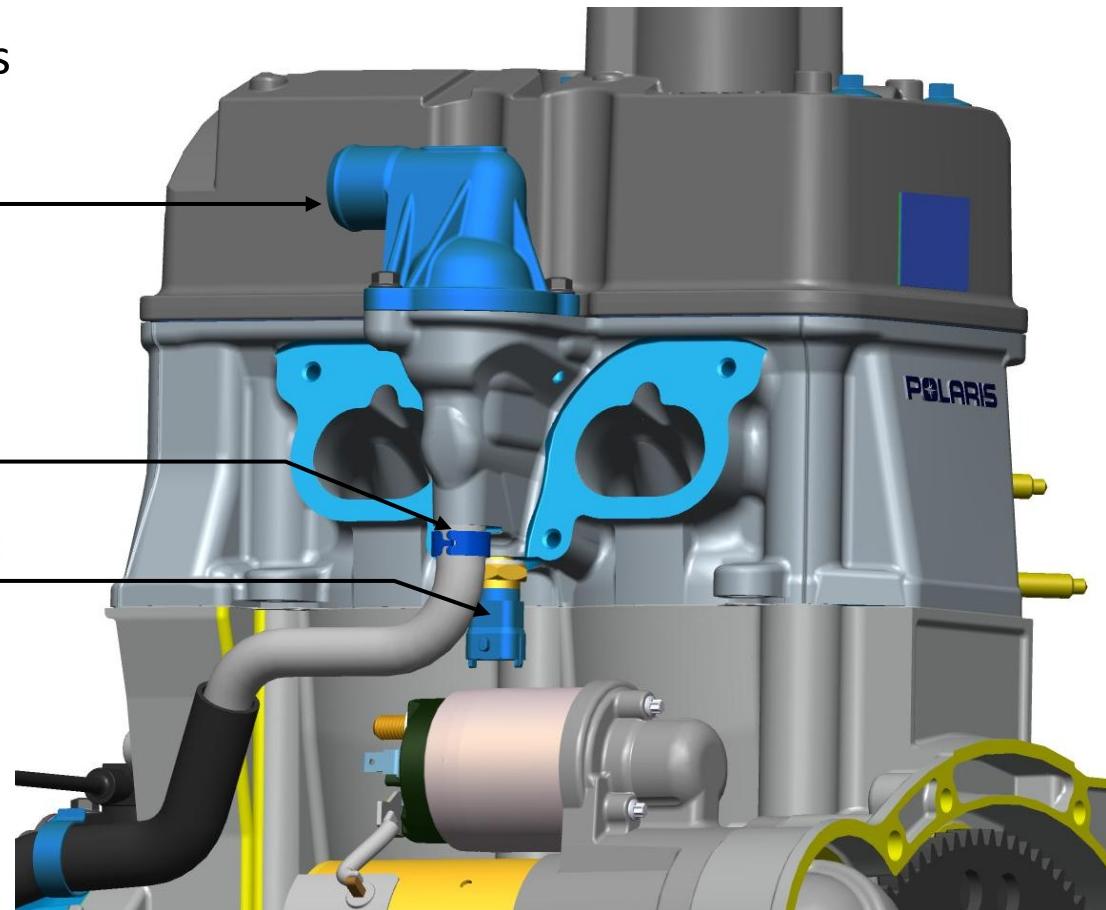
- Revised
 - Throttle body and mounting
 - TPS



Sportsman 850 XP

- Cylinder head revisions

Thermostat housing change to conform with airbox

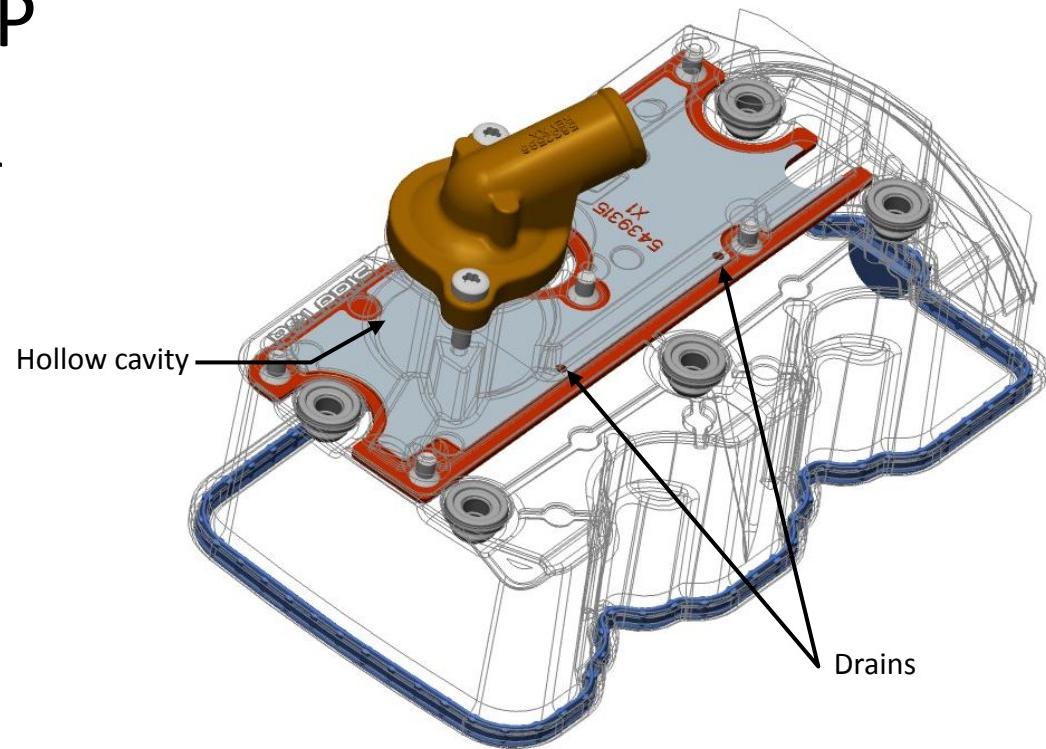
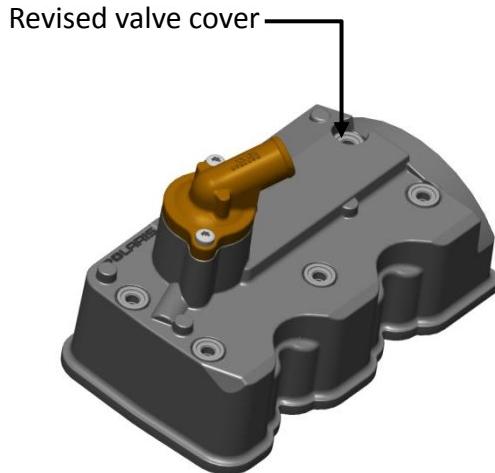


Cooling passage revised
Pressed in bypass fitting

Revised engine coolant mounts
facing downward

Sportsman 850 XP

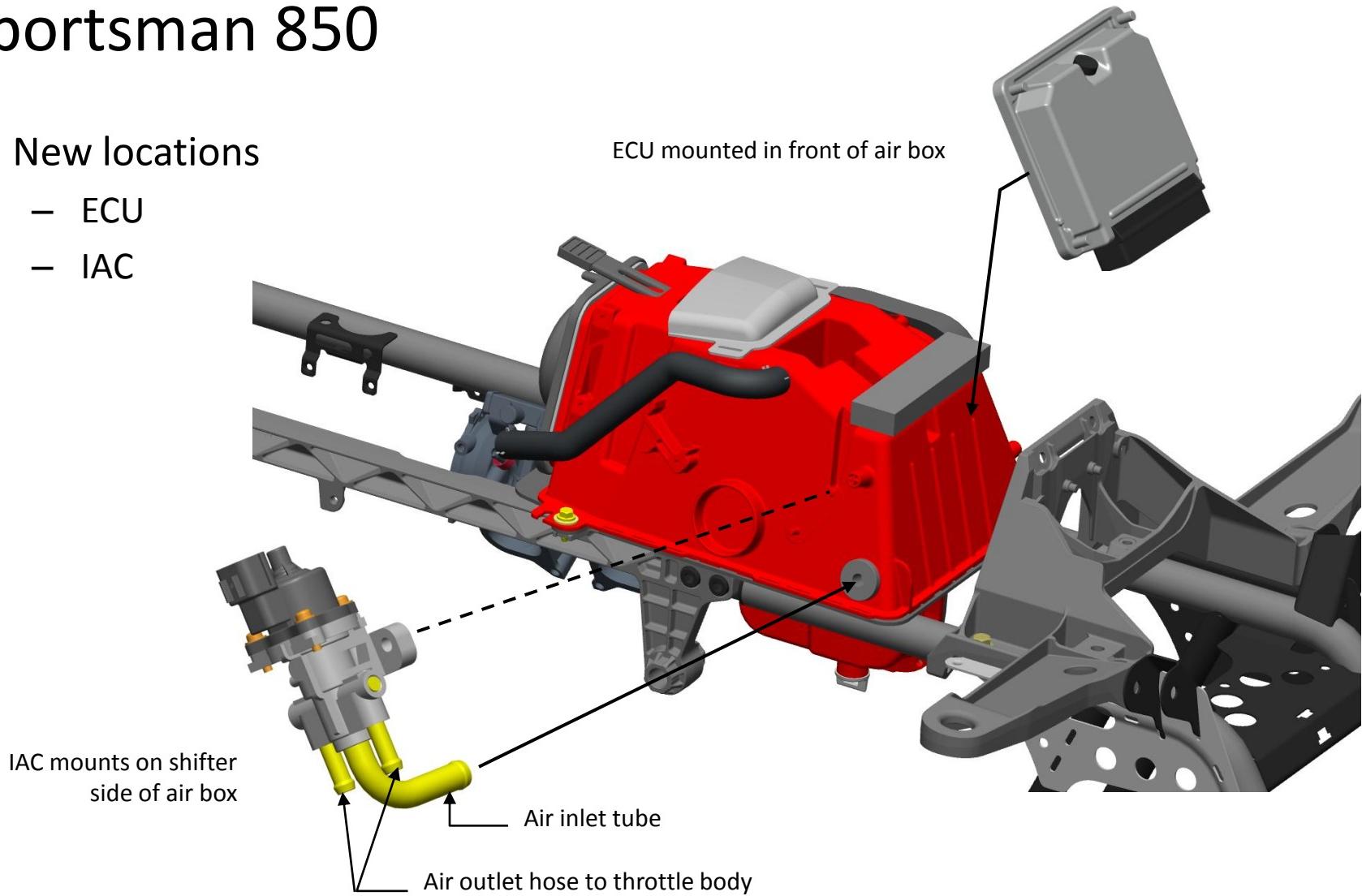
- Revised engine breather
 - Valve cover
 - Breather outlet



Valve cover transparent view

Sportsman 850

- New locations
 - ECU
 - IAC

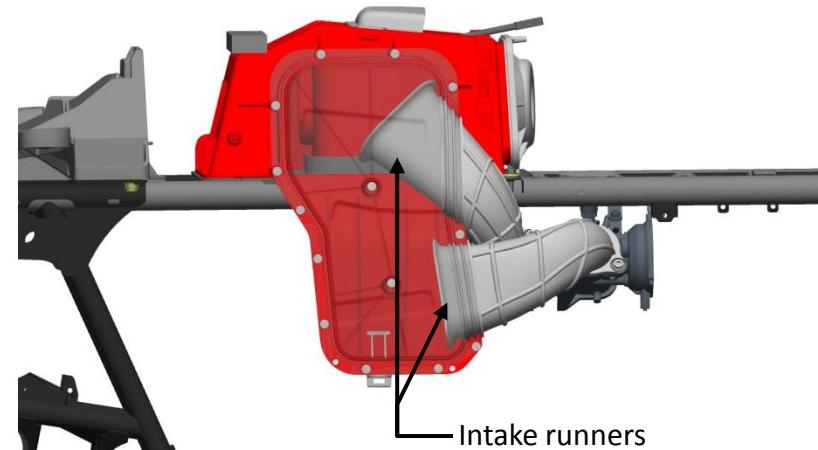


Sportsman 850 XP

- Revised
 - Air box plenum
 - Intake runners



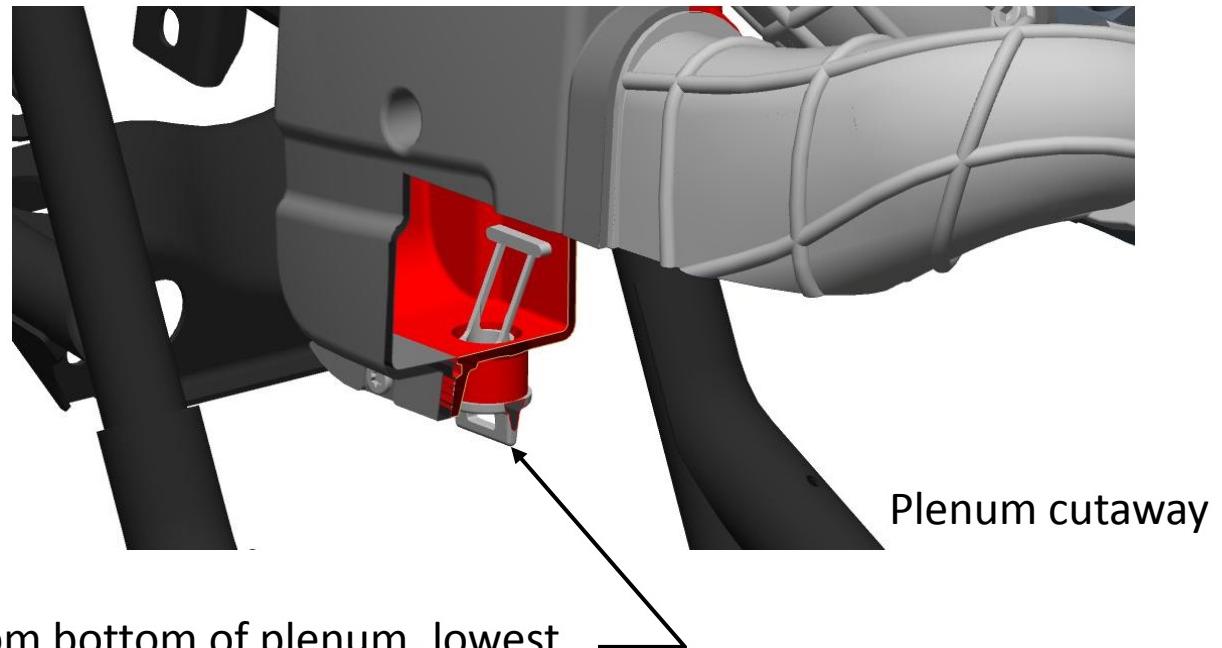
Side view



Side view: transparent plenum

Sportsman 850 XP

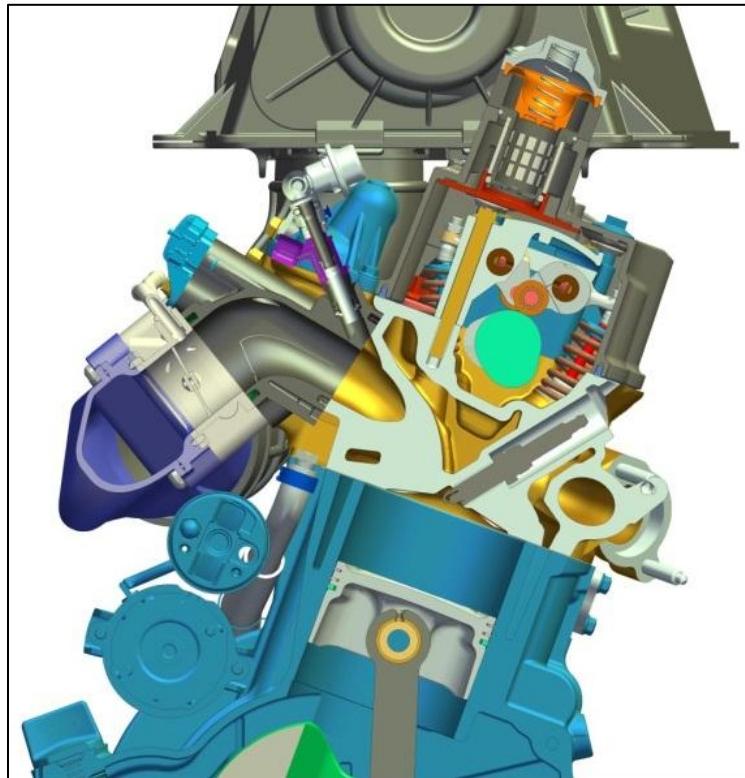
- Air box
 - Drain



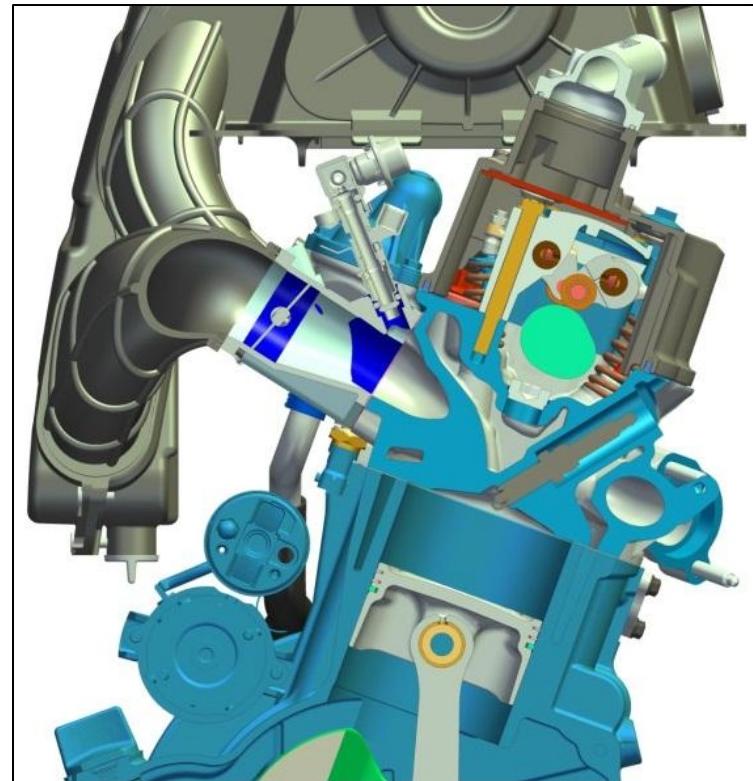
Drain plug unscrews from bottom of plenum, lowest section of plenum. Tail retains plug when removed.

Sportsman 850 XP

- Visual comparison between model year 2011 to 2012



2011



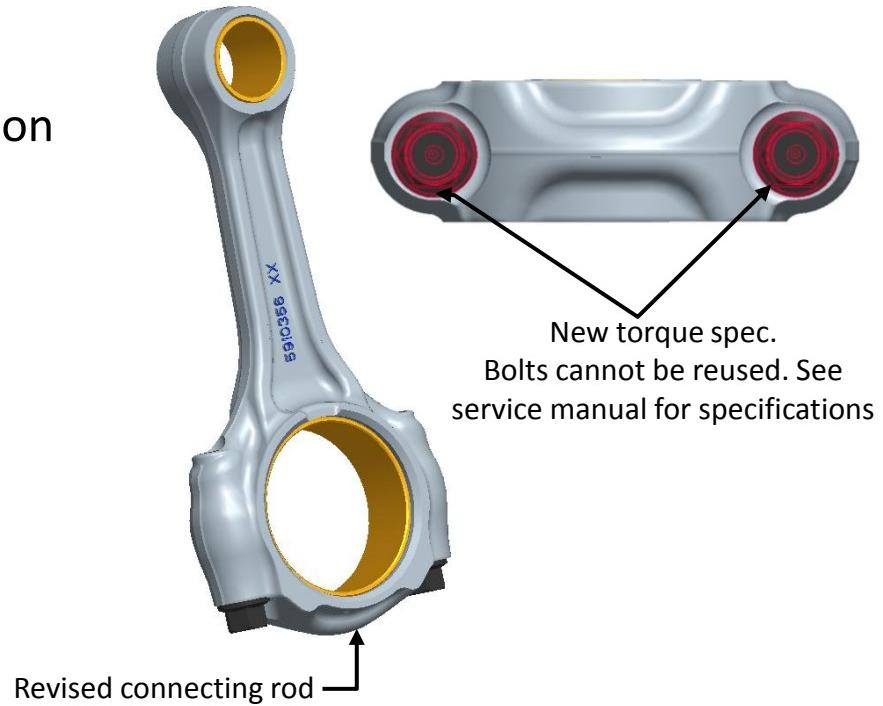
2012



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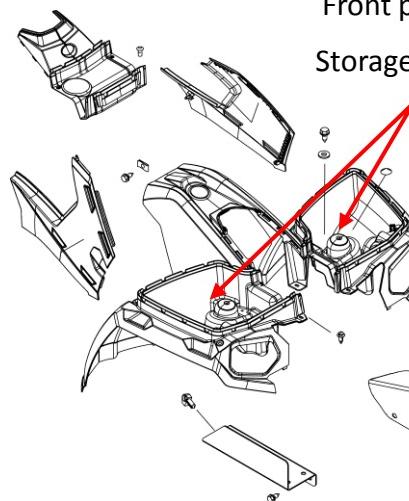
Sportsman 850 XP

- Specification changes
- Connecting rod bolt torque specification
 - Torque to yield bolts
 - Removed paint dot
 - Stamped with letter to identify color
- RPM limit
 - Model year 2011
 - 8000 RPM
 - Model year 2012
 - 7600 RPM
- Drive clutch weight change
 - Model year 2011
 - One-up utilizes 60 gram weights
 - Two-up utilizes 68 gram weights
 - Model year 2012
 - Common 63 gram weight between one and two up

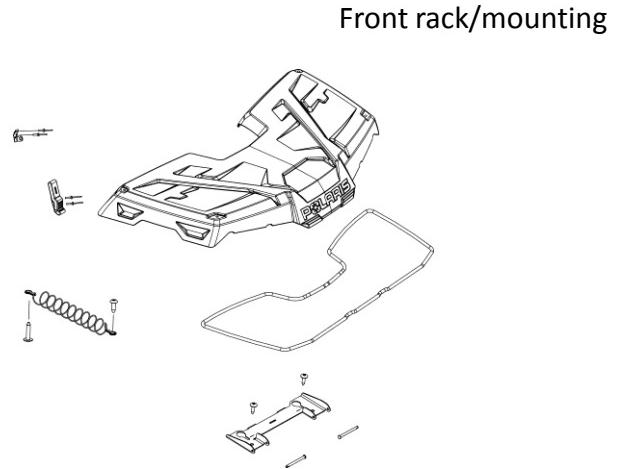


Classic Sportsman

- Revised front cab
- Under rack storage
 - Sportsman 400 HO
 - Sportsman 500 HO
 - Sportsman 800
 - Sportsman 500 HO Touring
 - Sportsman 800 6x6



Front plastic /mounting
Storage location



Front rack/mounting

International Tractor / Forest Sportsman

- Headlight adjustment
 - Headlight adjustment access plug

